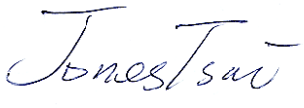
FCC RF Test Report

APPLICANT	: Samsung Electronics Co., Ltd.
EQUIPMENT	: Mobile Phone
BRAND NAME	: SAMSUNG
MODEL NAME	: SM-G5309W
FCC ID	: A3LSMG5309W
STANDARD	: 47 CFR Part 2, 27(M)
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jul. 28, 2014 and testing was completed on Aug. 25, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

Testing Laboratory
2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG471402B	Rev. 01	Initial issue of report	Aug. 27, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.2	N/A	Peak-to-Average Ratio	Reporting Only	PASS	-
3.3	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 41)	EIRP < 2Watt	PASS	-
3.4	§2.1049 §27.53(m)(6)	99% Occupied Bandwidth and 26dB Bandwidth	Reporting Only	PASS	-
3.5	§2.1051 §27.53(m)(4)	Conducted Band Edge Measurement (Band 41)	< 5MHz: -10 dBm 5 MHz~6MHz or 26dB(BW): -13 dBm ≥6MHz or 26dB(BW): -25 dBm	PASS	-
3.6	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 41)	< 55+10log10(P[Watts])	PASS	-
3.7	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 41)	< 55+10log10(P[Watts])	PASS	Under limit 26.88 dB at 8056.020 MHz
3.8	§2.1055 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	

1 General Description

1.1 Applicant

Samsung Electronics Co., Ltd.
416 Maetan-3dong, Yeongtong-gu, Suwon-City, Gyeonggi-do, 443-742, Korea

1.2 Manufacturer

Samsung Electronics Co., Ltd.
416 Maetan-3dong, Yeongtong-gu, Suwon-City, Gyeonggi-do, 443-742, Korea

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	SAMSUNG
Model Name	SM-G5309W
FCC ID	A3LSMG5309W
GSM Operating Band(s)	GSM 900/1800/1900MHz
GPRS/EGPRS Multi-slot Class	GPRS Class 33, EGPRS Class 33
WCDMA Operating Band(s)	FDD Band I / II / V
LTE Operating Band(s)	FDD Band 1 / 3, TDD Band 41
Wi-Fi Specification	2.4GHz 802.11b/g/n HT20
Bluetooth Version	Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
NFC Specification	Type A/B/F
HW Version	REV1.0
SW Version	G5309WKEU0ANG3
EUT Stage	Pre-Production

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	23.05 dBm
Antenna Type	IFA Antenna
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Maximum EIRP	Frequency Tolerance (ppm)	Emission Designator
Part27M	LTE Band 41	QPSK	5 MHz	0.0389 W	-	4M53G7D
Part27M	LTE Band 41	16QAM	5 MHz	0.0334 W	-	4M50W7D
Part27M	LTE Band 41	QPSK	10 MHz	-	0.0016 ppm	9M09G7D
Part27M	LTE Band 41	16QAM	10 MHz	-	-	9M03W7D
Part27M	LTE Band 41	QPSK	15 MHz	-	-	13M5G7D
Part27M	LTE Band 41	16QAM	15 MHz	-	-	13M5W7D
Part27M	LTE Band 41	QPSK	20 MHz	0.0390 W	-	18M5G7D
Part27M	LTE Band 41	16QAM	20 MHz	0.0323 W	-	18M4W7D

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
Test Site No.	**Sporton Site No.**		**FCC Registration No.**
	TH01-SZ	03CH01-SZ	831040

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 27(M)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

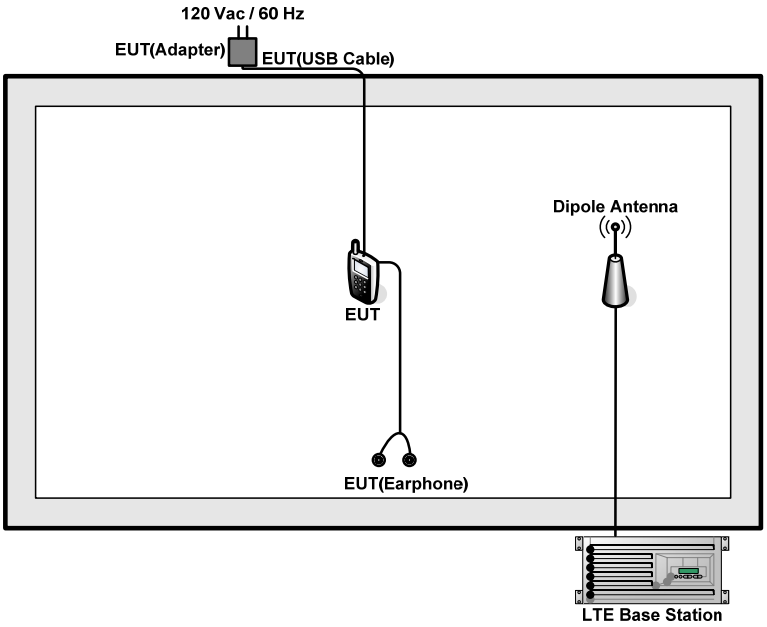
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	41	-	-				v		v	v		v	v	v	v
26dB and 99% Bandwidth	41	-	-	v	v	v	v	v	v			v		v	
Conducted Band Edge	41	-	-	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	41	-	-	v	v	v	v	v	v	v			v	v	v
Frequency Stability	41	-	-		v			v				v		v	
E.I.R.P.	41	-	-	v			v	v	v	v			v	v	v
Radiated Spurious Emission	41	-	-	v	v	v	v	v		v			v	v	v
Note	1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. For E.I.R.P. measurement, the widest bandwidth of each band is chosen for testing due to highest conducted power. Besides, the lowest bandwidth of each band is also measured for reporting only. 4. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 8.5 dB and 10dB attenuator.

Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 8.5 + 10 = 18.5 (dB)

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

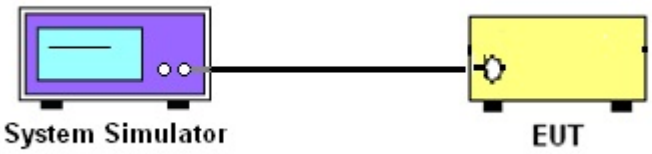
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

<LTE Band 41 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				**39750**	**40620**	**41490**
Frequency (MHz)				**2506**	**2593**	**2680**
20	QPSK	1	0	22.71	22.97	22.46
20	QPSK	1	49	22.68	22.88	22.43
20	QPSK	1	99	22.78	**23.05**	22.62
20	QPSK	50	0	21.69	22.14	21.84
20	QPSK	50	24	21.66	22.12	21.71
20	QPSK	50	49	21.53	21.95	21.76
20	QPSK	100	0	21.63	22.03	21.60
20	16QAM	1	0	21.88	22.11	22.20
20	16QAM	1	49	21.84	22.17	22.07
20	16QAM	1	99	21.90	22.38	21.99
20	16QAM	50	0	20.70	20.83	20.82
20	16QAM	50	24	20.66	21.16	20.73
20	16QAM	50	49	20.59	21.01	20.81
20	16QAM	100	0	20.81	20.77	20.59
Channel				**39725**	**40620**	**41515**
Frequency (MHz)				**2503.5**	**2593**	**2682.5**
15	QPSK	1	0	22.72	23.03	22.73
15	QPSK	1	37	22.64	22.98	22.86
15	QPSK	1	74	22.77	23.04	22.60
15	QPSK	36	0	21.66	22.02	21.64
15	QPSK	36	18	21.66	22.00	21.87
15	QPSK	36	37	21.76	21.95	21.96
15	QPSK	75	0	21.55	21.95	21.77
15	16QAM	1	0	21.89	22.11	21.77
15	16QAM	1	37	22.08	22.12	21.99
15	16QAM	1	74	21.85	22.14	21.90
15	16QAM	36	0	20.70	20.70	20.56
15	16QAM	36	18	20.62	21.03	20.82
15	16QAM	36	37	20.67	20.92	20.95
15	16QAM	75	0	20.68	20.67	20.75

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				**39700**	**40620**	**41540**
Frequency (MHz)				**2501**	**2593**	**2685**
10	QPSK	1	0	22.64	22.95	22.58
10	QPSK	1	24	22.63	22.89	22.46
10	QPSK	1	49	22.65	22.90	22.67
10	QPSK	25	0	21.69	22.19	21.82
10	QPSK	25	12	21.65	22.05	21.63
10	QPSK	25	24	21.71	22.07	21.88
10	QPSK	50	0	21.60	21.85	22.12
10	16QAM	1	0	21.82	22.17	22.09
10	16QAM	1	24	21.86	22.08	22.07
10	16QAM	1	49	21.87	21.97	21.84
10	16QAM	25	0	20.74	20.91	20.91
10	16QAM	25	12	20.59	20.77	20.65
10	16QAM	25	24	20.68	20.82	20.85
10	16QAM	50	0	20.66	20.88	20.72
Channel				**39675**	**40620**	**41565**
Frequency (MHz)				**2498.5**	**2593**	**2687.5**
5	QPSK	1	0	22.64	22.94	22.80
5	QPSK	1	12	22.73	22.85	22.56
5	QPSK	1	24	22.63	22.81	22.70
5	QPSK	12	0	21.85	22.13	21.85
5	QPSK	12	6	21.79	22.10	22.02
5	QPSK	12	11	21.77	22.07	21.92
5	QPSK	25	0	21.65	22.00	22.01
5	16QAM	1	0	21.81	22.11	21.95
5	16QAM	1	12	21.91	22.17	21.91
5	16QAM	1	24	21.93	22.15	22.24
5	16QAM	12	0	21.20	21.18	21.20
5	16QAM	12	6	20.92	21.15	21.04
5	16QAM	12	11	20.93	21.13	20.96
5	16QAM	25	0	20.68	20.70	20.73

Note: Maximum average power for LTE.

3.2 Peak-to-Average Ratio

3.2.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

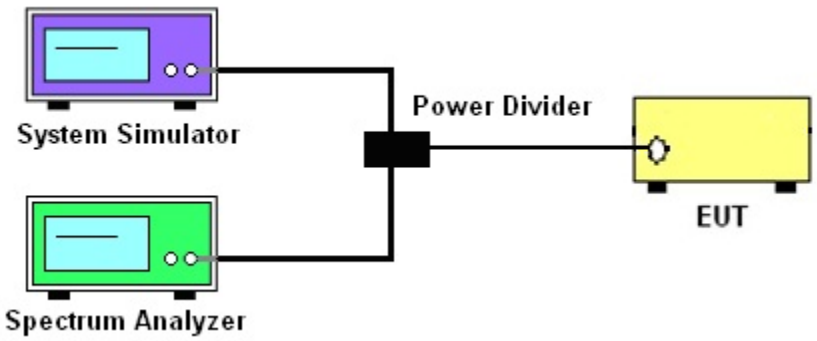
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



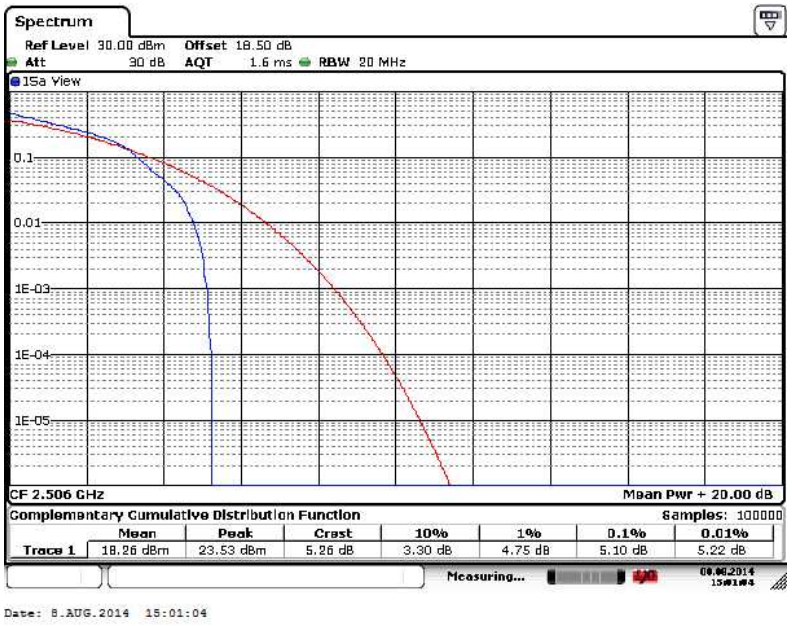
3.2.5 Test Result of Peak-to-Average Ratio

LTE Band 41						
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				39750	40620	41490
Frequency (MHz)				2506	2593	2680
20	16QAM	1	0	5.10	4.75	5.01
20	16QAM	100	0	5.68	5.22	5.86

3.2.6 Peak to Average Power Ratio

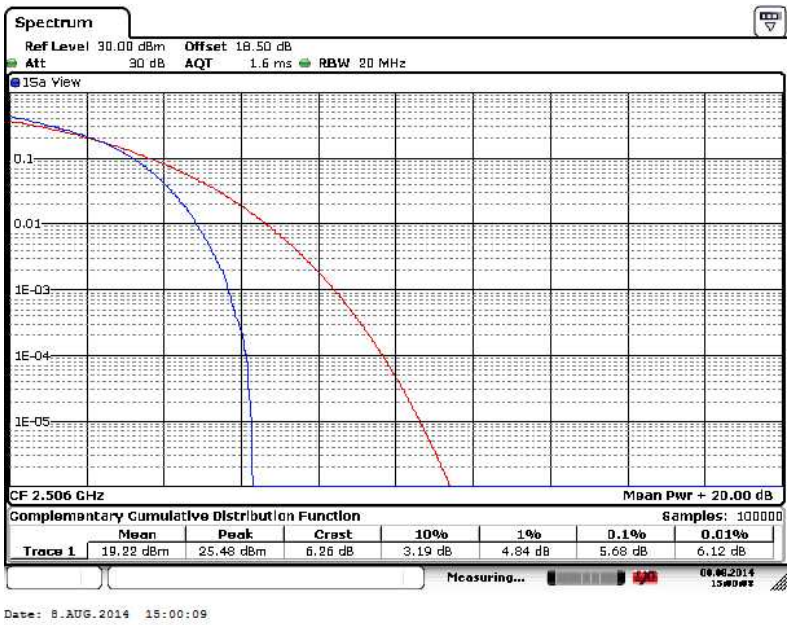
Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 39750 (1RB Size)



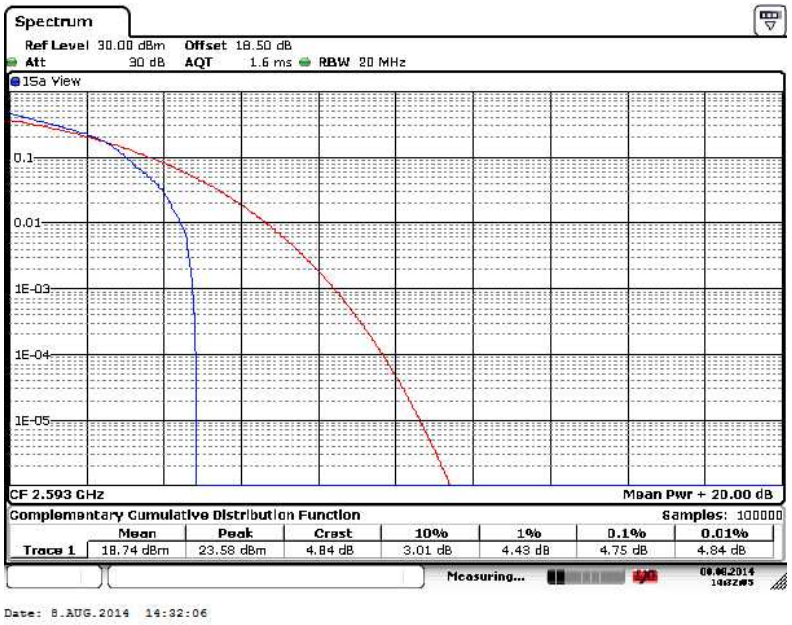
Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 39750 (100RB Size)



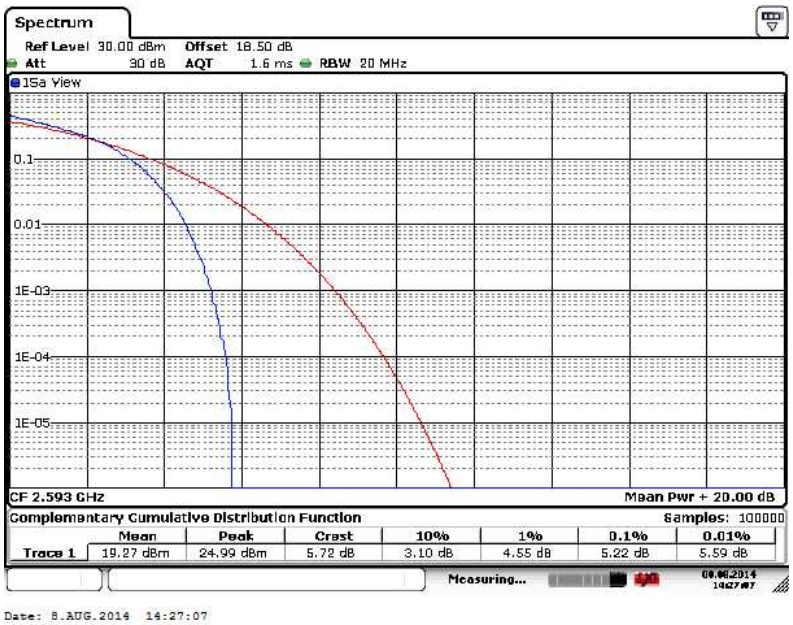
Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 40620 (1RB Size)



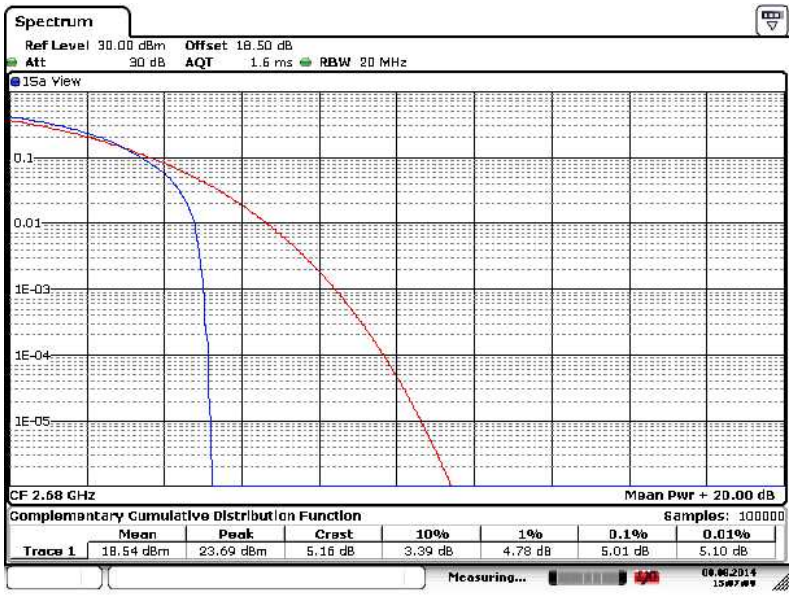
Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 40620 (100RB Size)



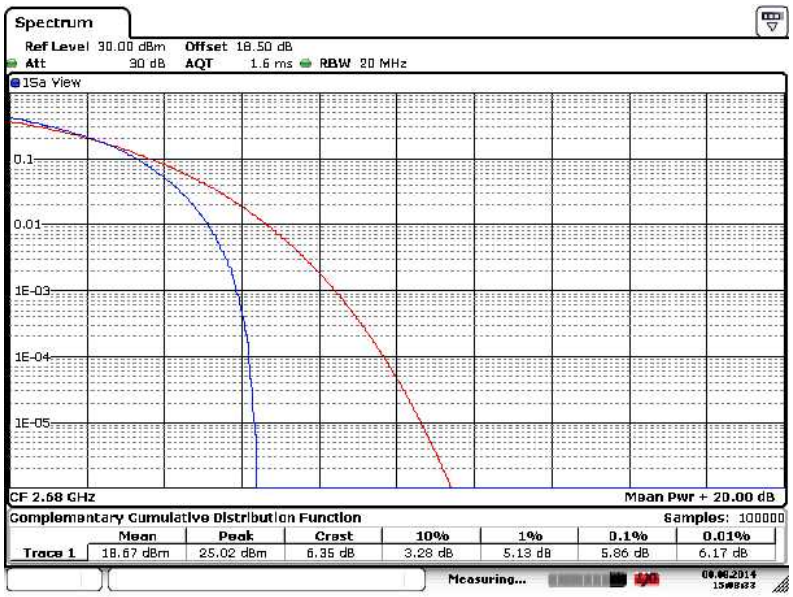
Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 41490 (1RB Size)



Peak-to-Average Ratio on LTE Band 41

20MHz / 16QAM in Ch. 41490 (100RB Size)



3.3 Equivalent Isotropic Radiated Power Measurement

3.3.1 Description of the EIRP Measurement

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 41.

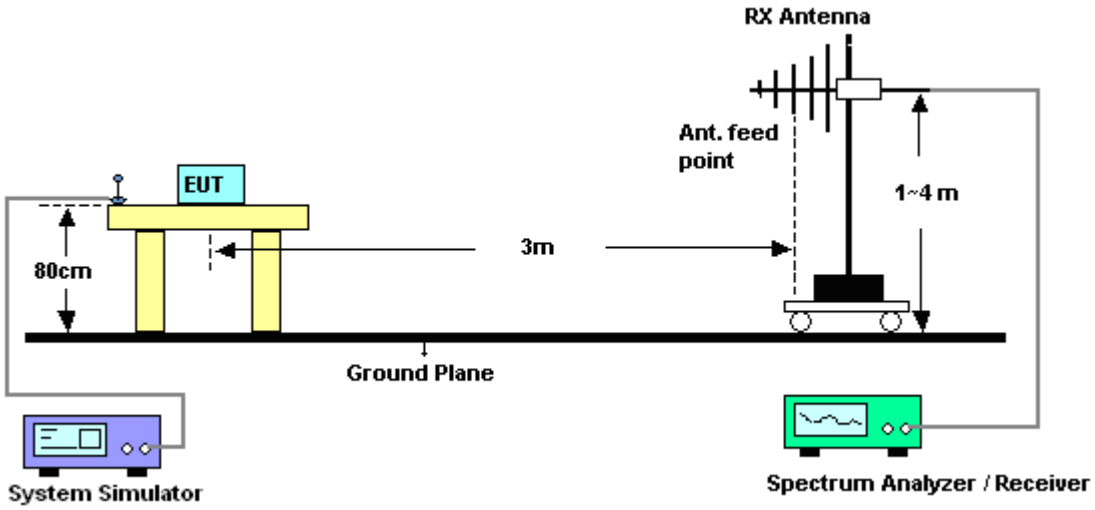
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
2. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP= LVL + Correction factor and ERP = EIRP – 2.15.

3.3.4 Test Setup



3.3.5 Test Result of EIRP

LTE Band 41 Radiated Power EIRP for BW 5MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2498.5	-29.90	47.413	15.36	0.0344
2593	-29.71	47.754	15.89	0.0389
2687.5	-30.58	47.531	14.80	0.0302
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2498.5	-29.29	46.937	15.50	0.0355
2593	-30.39	48.117	15.58	0.0361
2687.5	-30.19	47.45	15.11	0.0324

LTE Band 41 Radiated Power EIRP for BW 5MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2498.5	-30.49	47.413	14.77	0.0300
2593	-30.37	47.754	15.23	0.0334
2687.5	-30.81	47.531	14.57	0.0286
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2498.5	-30.29	46.937	14.50	0.0282
2593	-30.75	48.117	15.22	0.0332
2687.5	-30.98	47.45	14.32	0.0270

LTE Band 41 Radiated Power EIRP for BW 20MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2506	-30.38	47.553	15.02	0.0318
2593	-30.24	47.754	15.36	0.0344
2680	-30.57	47.531	14.81	0.0303
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2506	-30.19	47.067	14.73	0.0297
2593	-30.06	48.117	15.91	0.0390
2680	-30.58	47.45	14.72	0.0296

LTE Band 41 Radiated Power EIRP for BW 20MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2506	-30.98	47.413	14.28	0.0268
2593	-30.93	47.754	14.67	0.0293
2680	-30.83	47.531	14.55	0.0285
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
2506	-30.14	46.937	14.65	0.0292
2593	-30.88	48.117	15.09	0.0323
2680	-30.38	47.45	14.92	0.0310

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.4.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

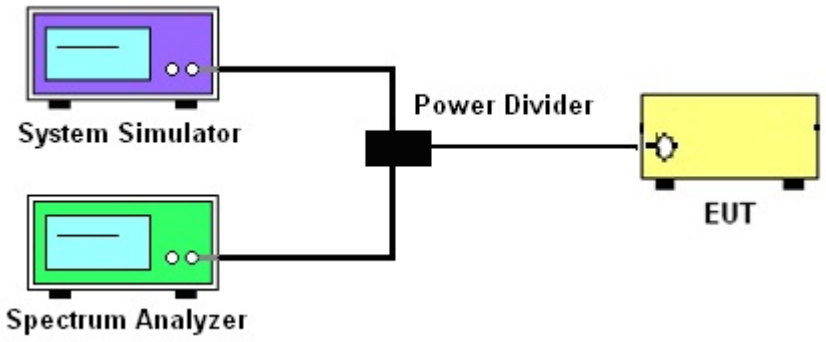
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

3.4.4 Test Setup



3.4.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

Modes	LTE Band 41			
BW / Mod.	**5MHz / QPSK**	**5MHz / 16QAM**	**10MHz / QPSK**	**10MHz / 16QAM**
99% OBW (MHz)	4.530	4.501	9.088	9.030
26dB BW (MHz)	5.065	5.036	10.101	9.986
BW / Mod.	**15MHz / QPSK**	**15MHz / 16QAM**	**20MHz / QPSK**	**20MHz / 16QAM**
99% OBW (MHz)	13.459	13.502	18.466	18.408
26dB BW (MHz)	14.761	14.848	20.376	20.492

Note:

The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

BW5.0MHz RB setting：RB Size 25, RB offset 0

BW10MHz RB setting：RB Size 50, RB offset 0

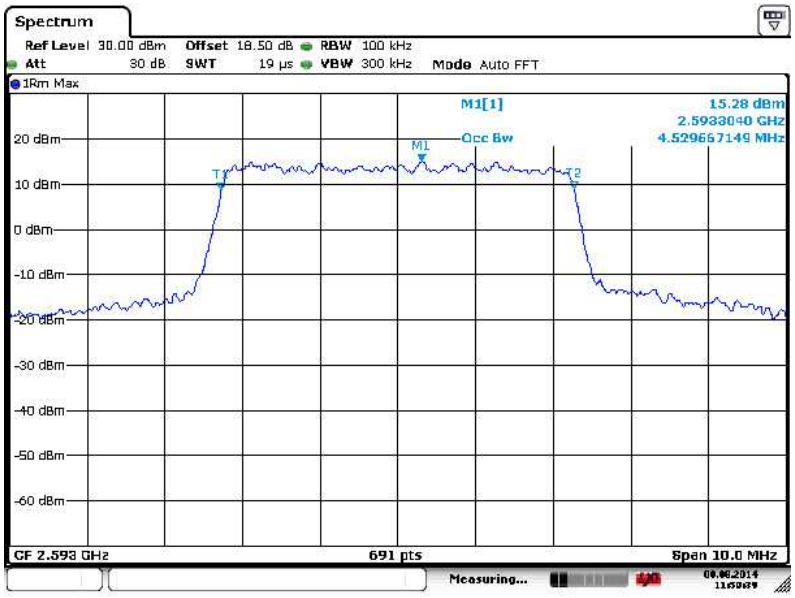
BW15MHz RB setting：RB Size 75, RB offset 0

BW20MHz RB setting：RB Size 100, RB offset 0

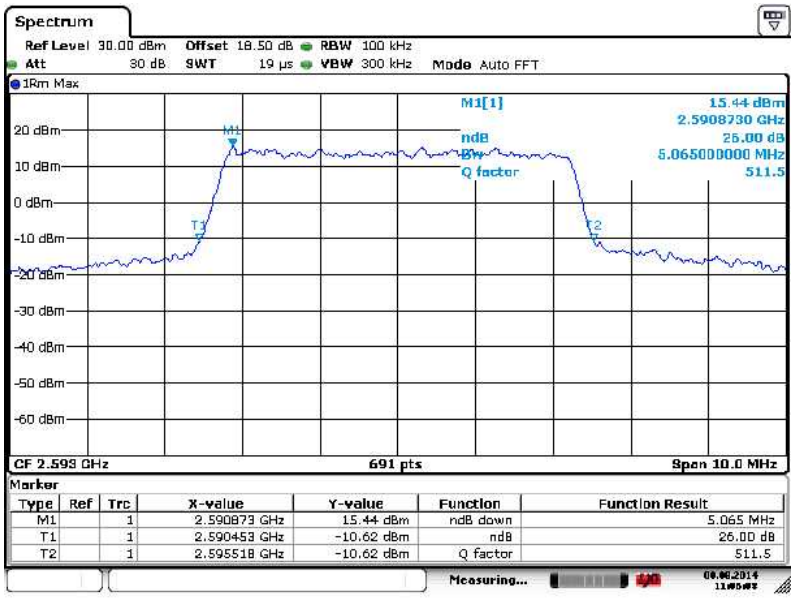
3.4.6 Test Result (Plots) of 99% Occupied Bandwidth

Band :	LTE Band 41	BW / Mod. :	5MHz / QPSK

99% Occupied Bandwidth Plot on Channel 40620

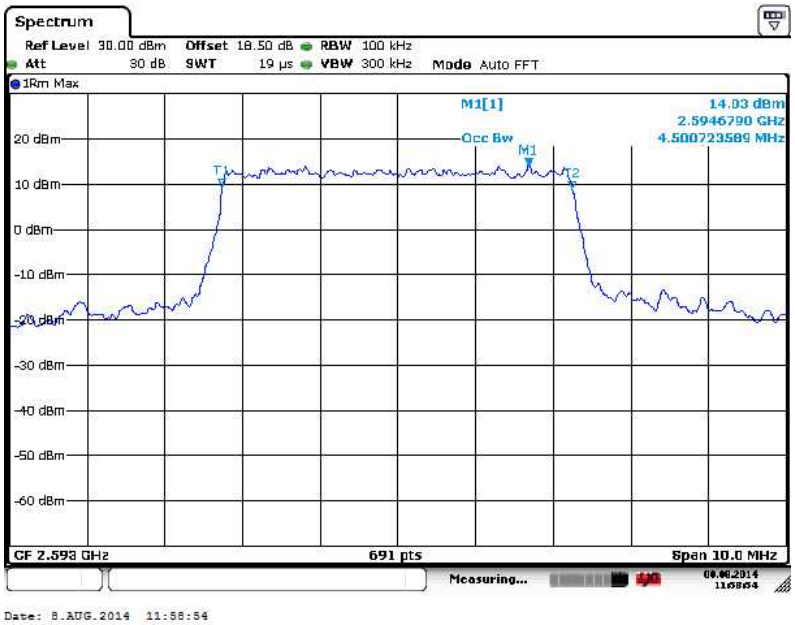


26dB Bandwidth Plot on Channel 40620

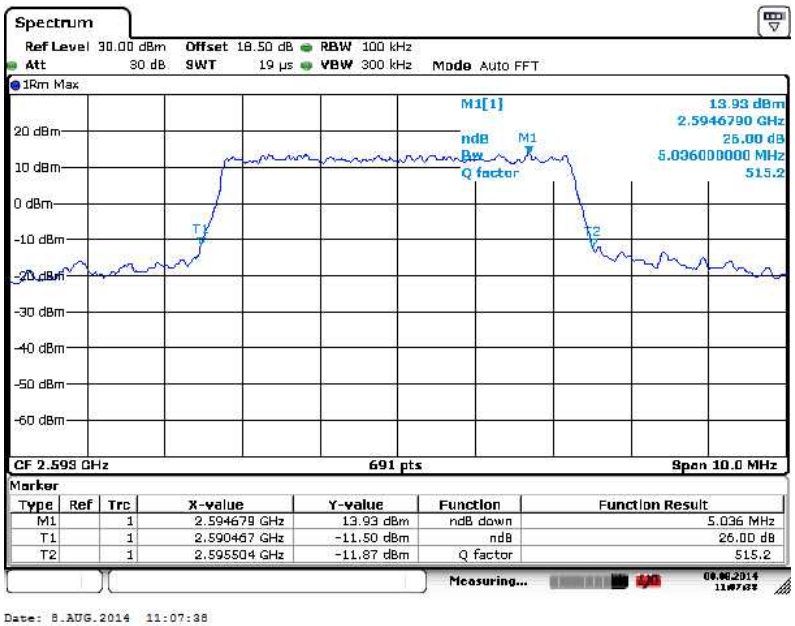


Band :	LTE Band 41	BW / Mod. :	5MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 40620

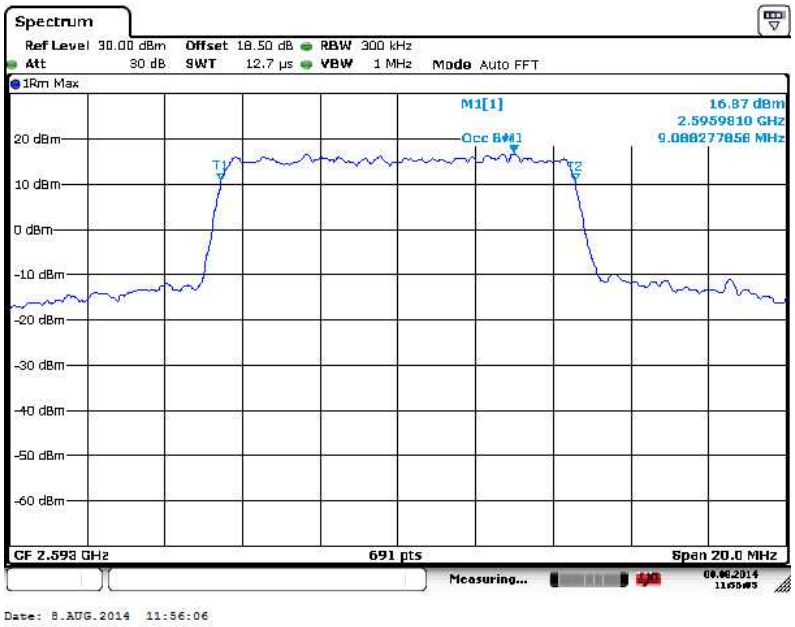


26dB Bandwidth Plot on Channel 40620

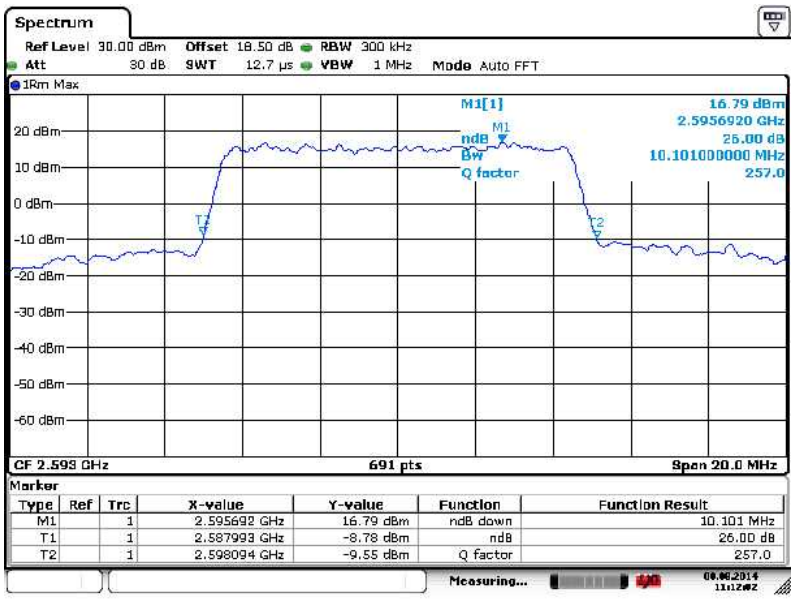


Band :	LTE Band 41	BW / Mod. :	10MHz / QPSK

99% Occupied Bandwidth Plot on Channel 40620

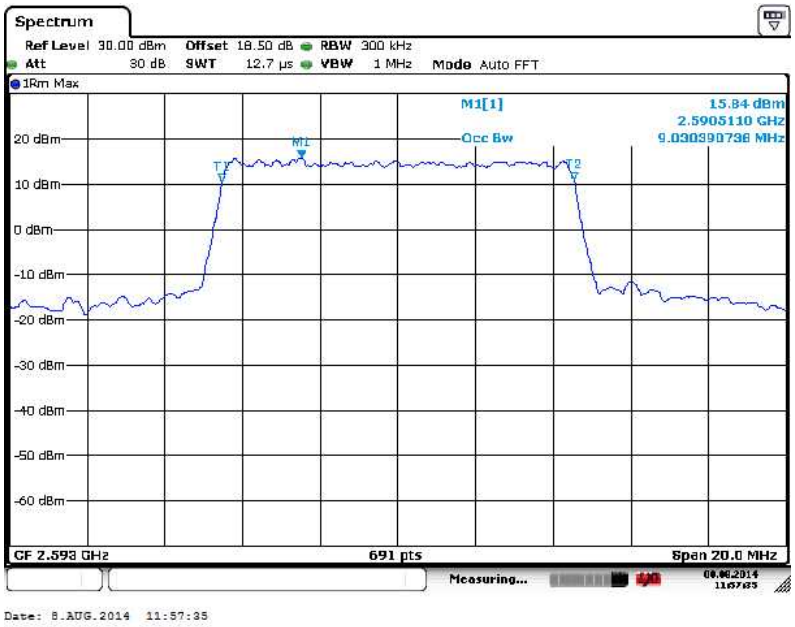


26dB Bandwidth Plot on Channel 40620

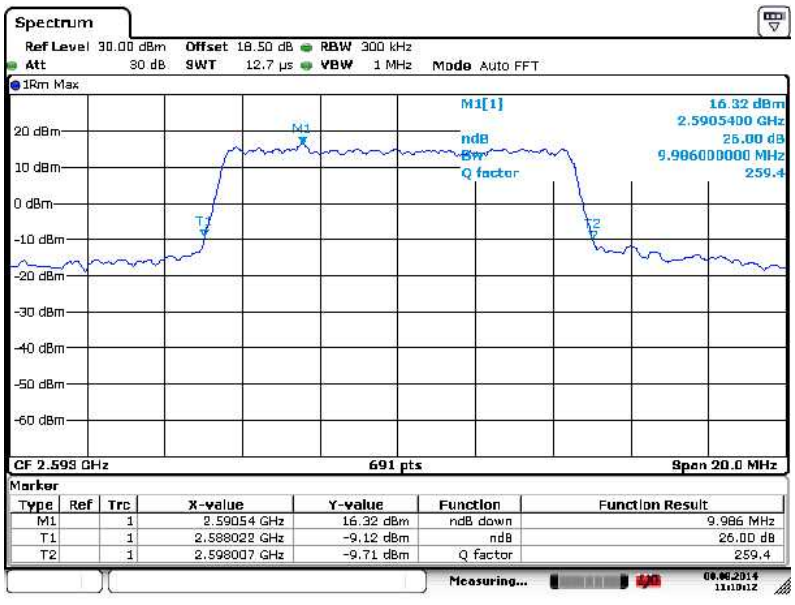


Band :	LTE Band 41	BW / Mod. :	10MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 40620

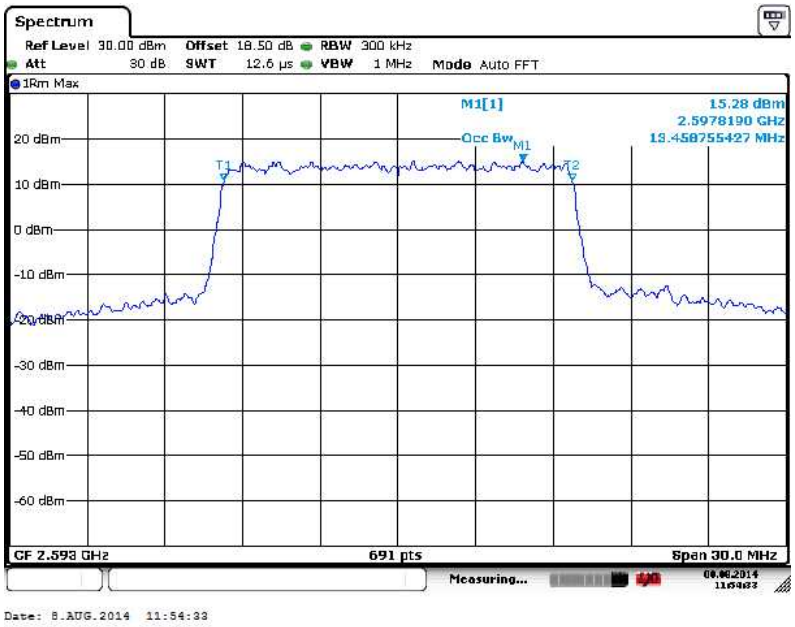


26dB Bandwidth Plot on Channel 40620

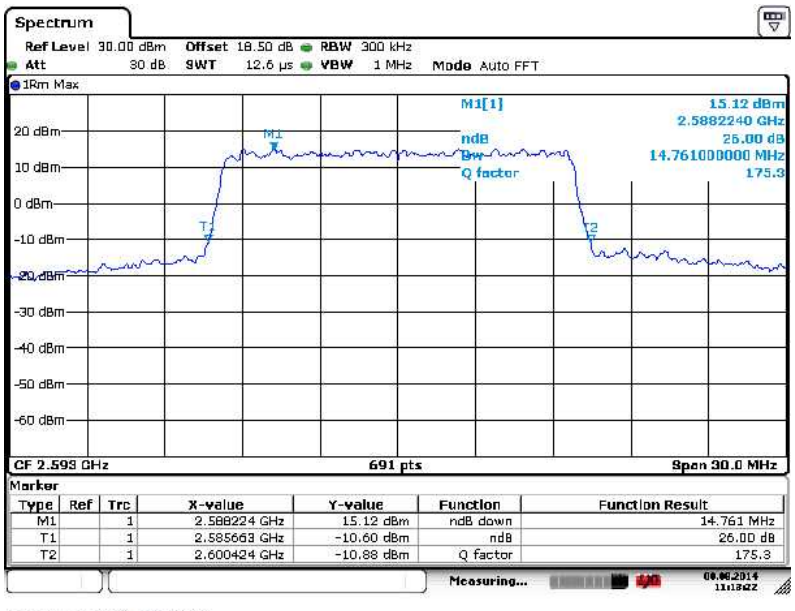


Band :	LTE Band 41	BW / Mod. :	15MHz / QPSK

99% Occupied Bandwidth Plot on Channel 40620

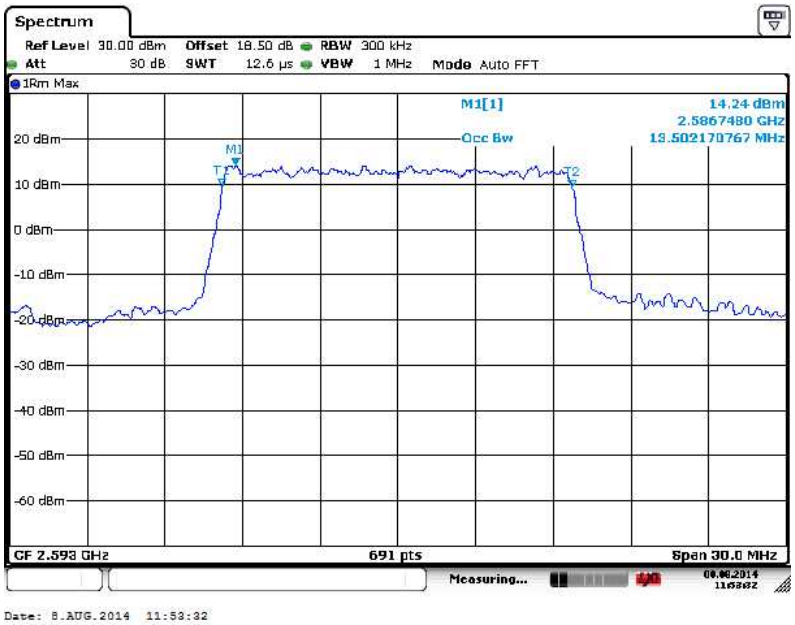


26dB Bandwidth Plot on Channel 40620

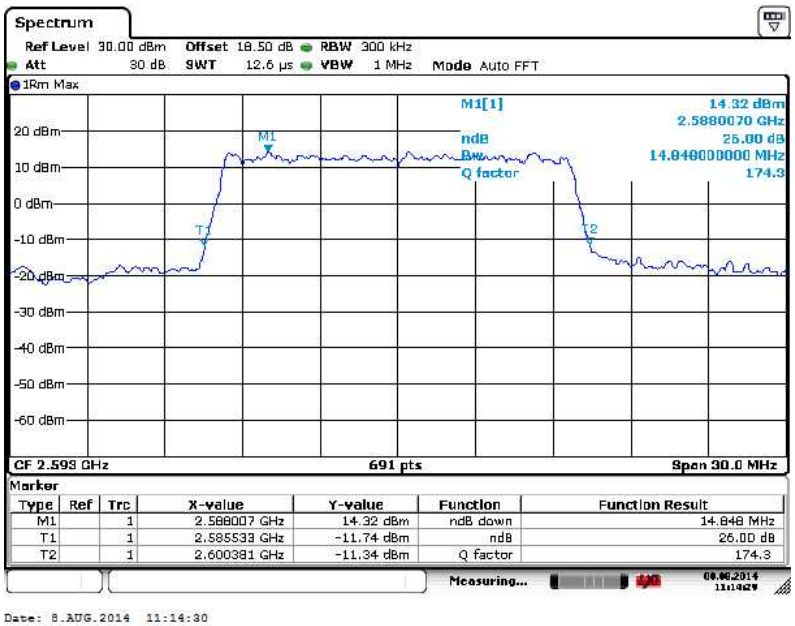


Band :	LTE Band 41	BW / Mod. :	15MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 40620

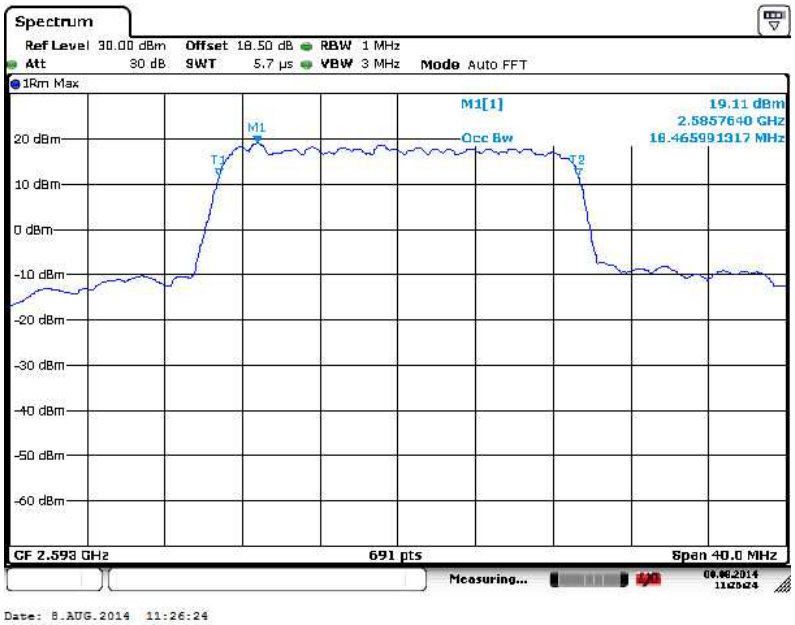


26dB Bandwidth Plot on Channel 40620

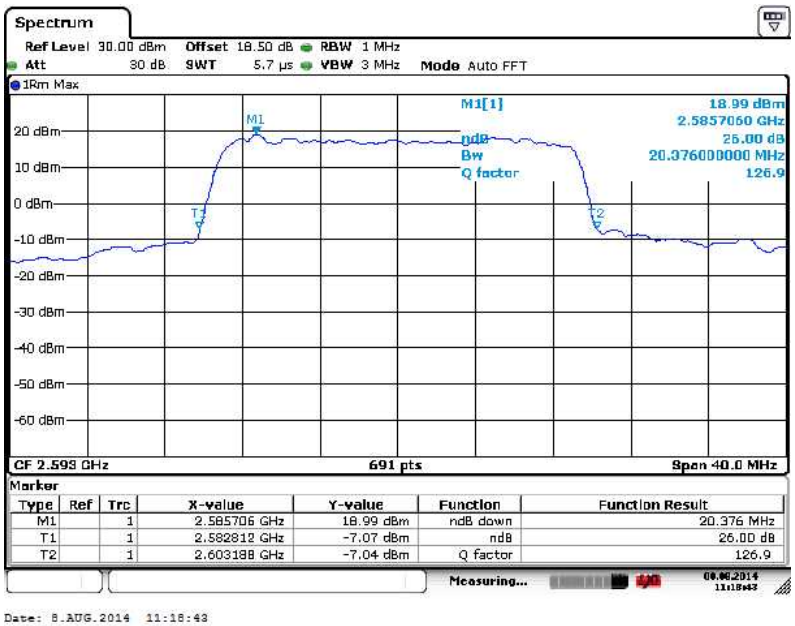


Band :	LTE Band 41	BW / Mod. :	20MHz / QPSK

99% Occupied Bandwidth Plot on Channel 40620

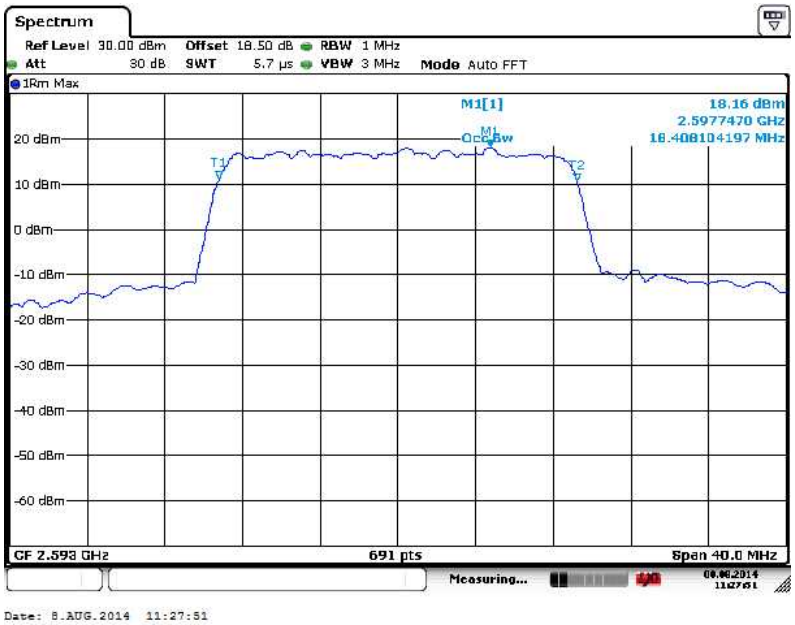


26dB Bandwidth Plot on Channel 40620

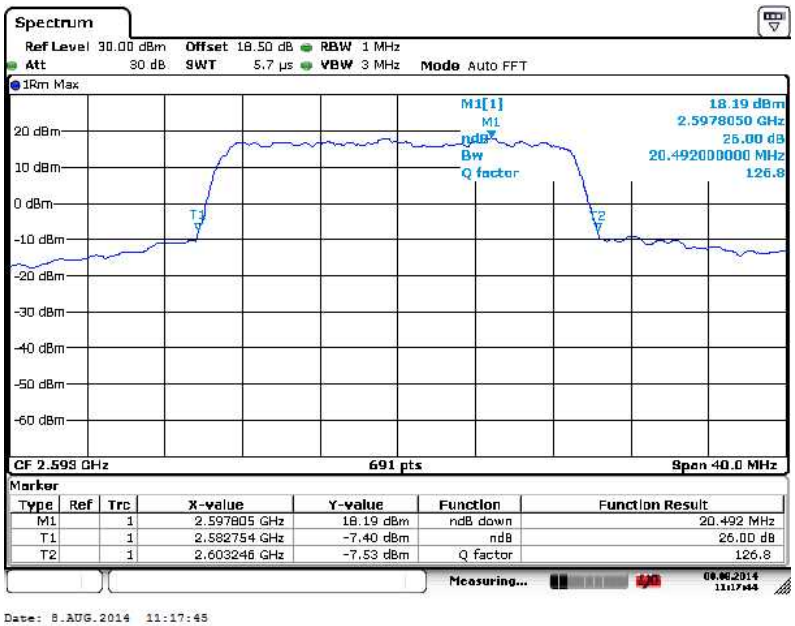


Band :	LTE Band 41	BW / Mod. :	20MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 40620



26dB Bandwidth Plot on Channel 40620



3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

27.53(m)(4):

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

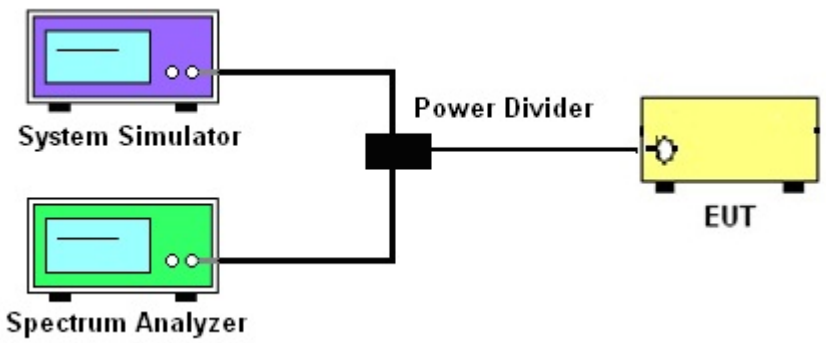
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

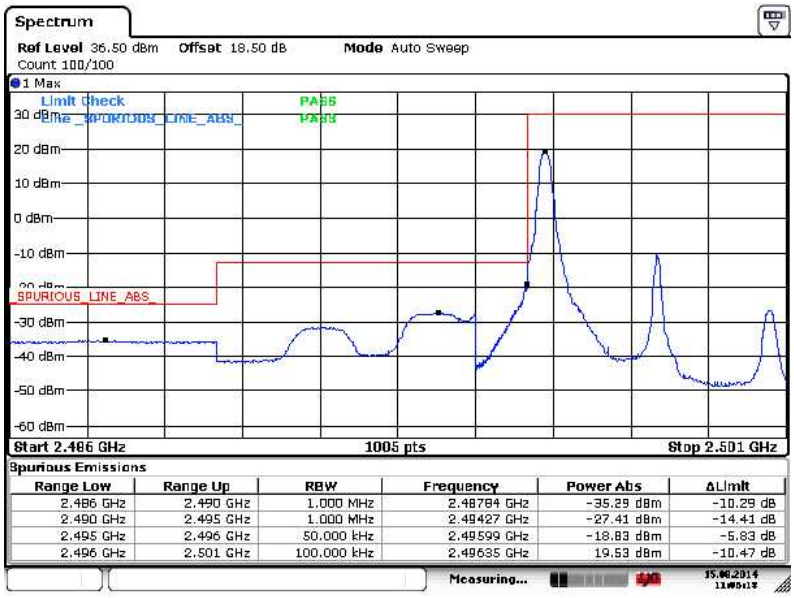
3.5.4 Test Setup



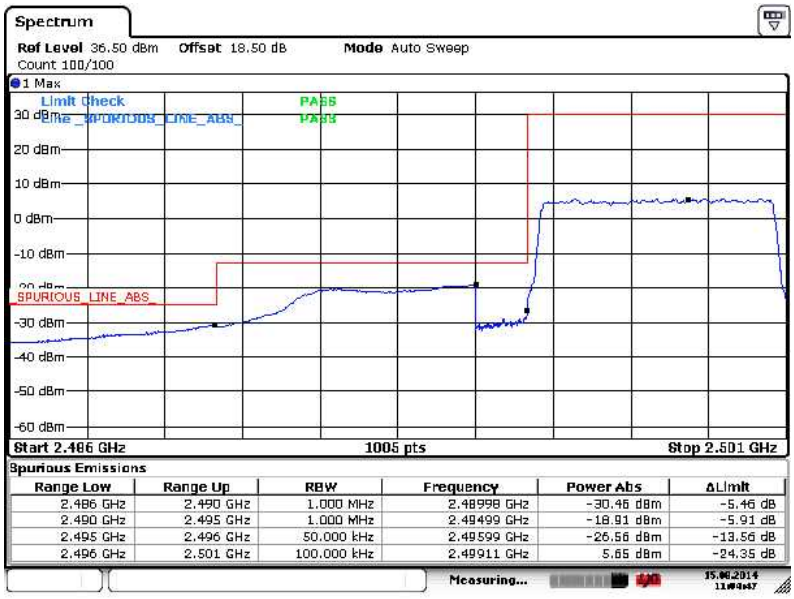
3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	LTE Band 41	Band Width :	5MHz / QPSK

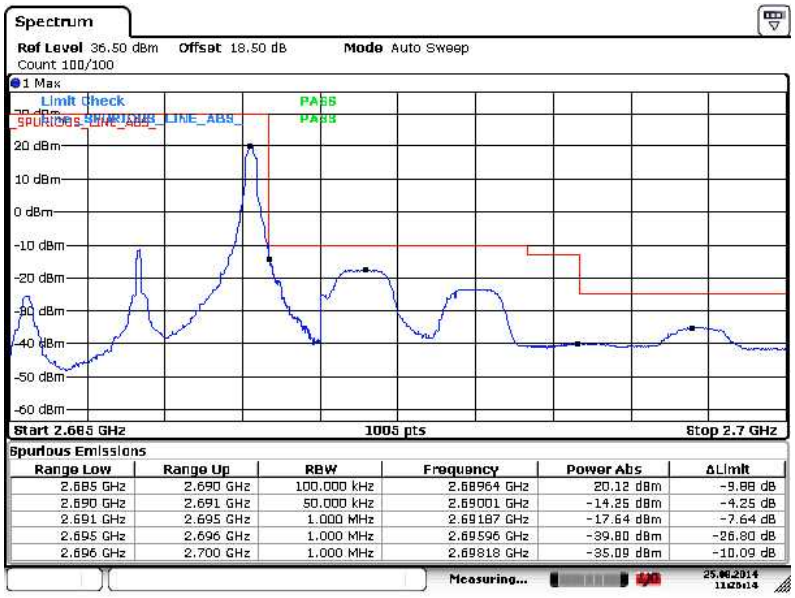
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



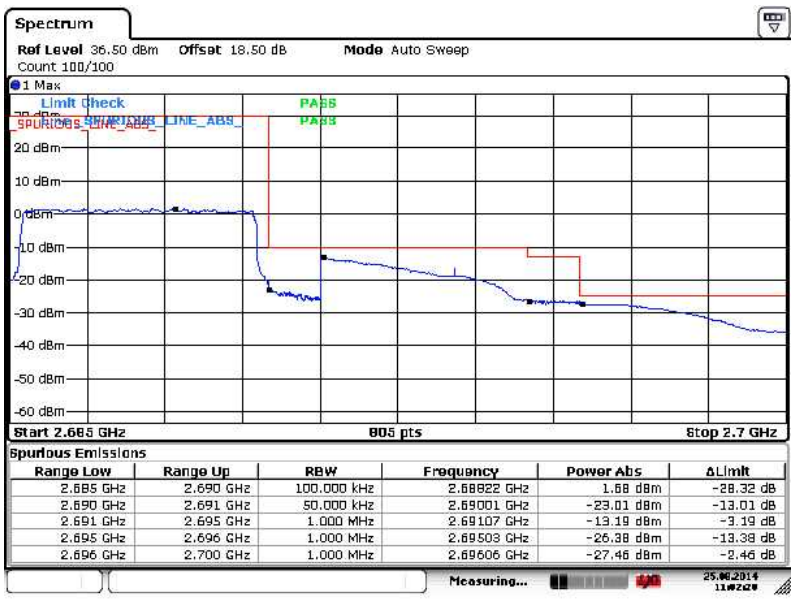
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24

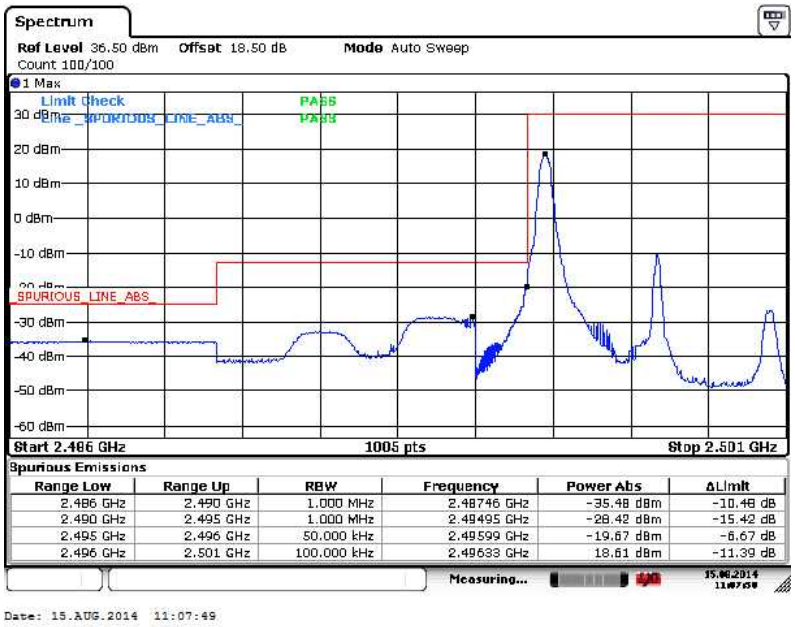


Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

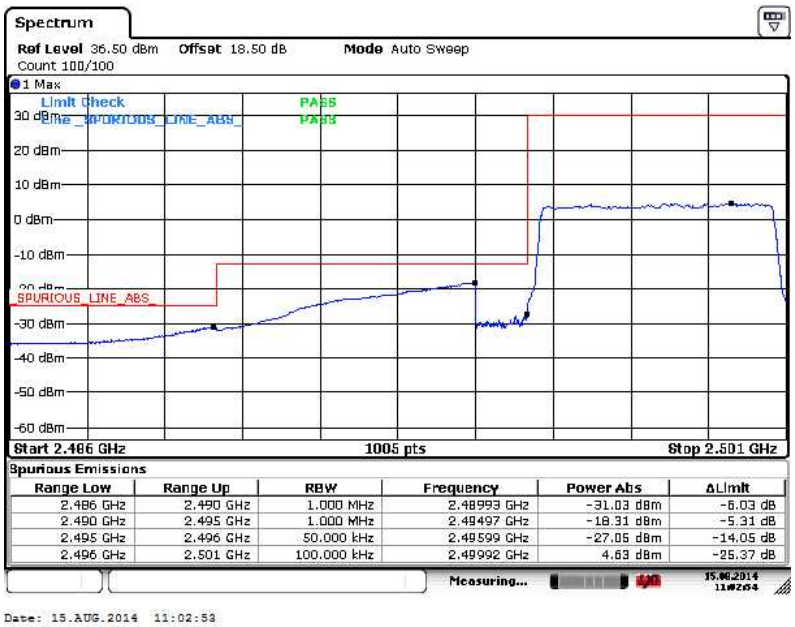


Band :	LTE Band 41	Band Width :	5MHz / 16QAM

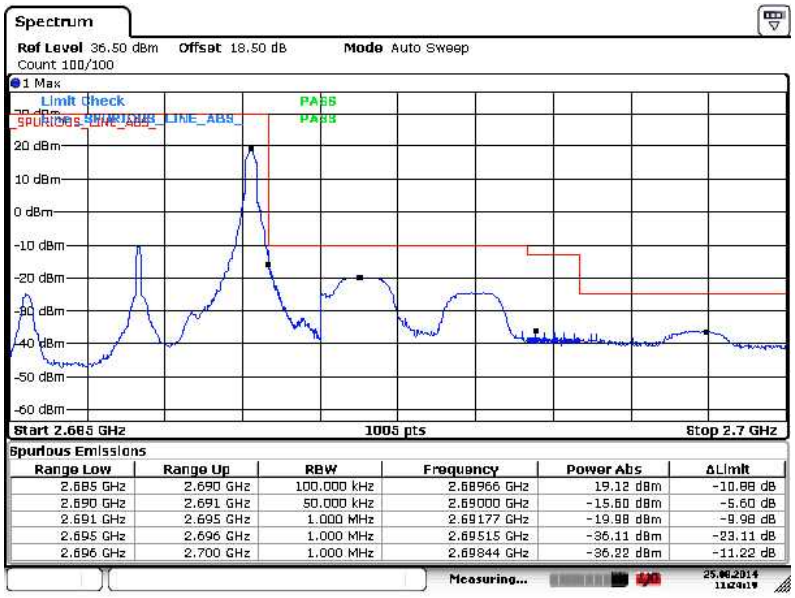
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0

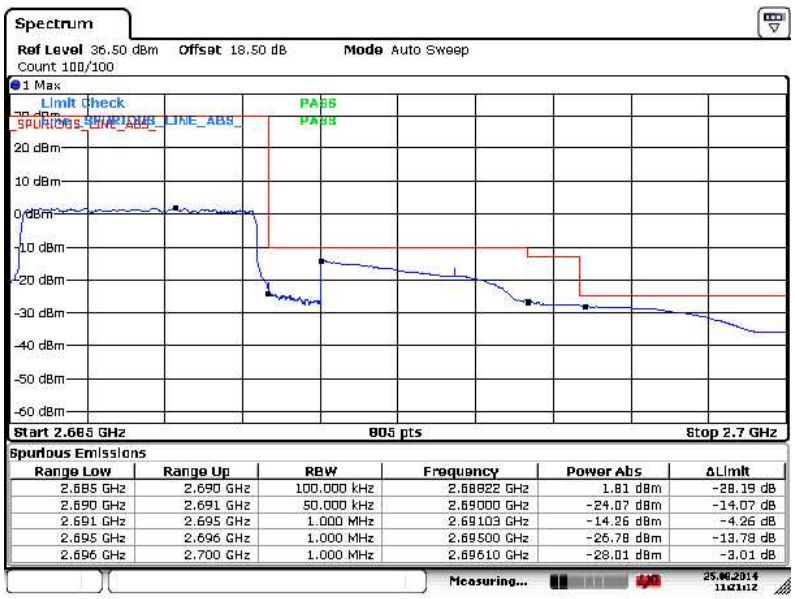


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 25.AUG.2014 11:24:19

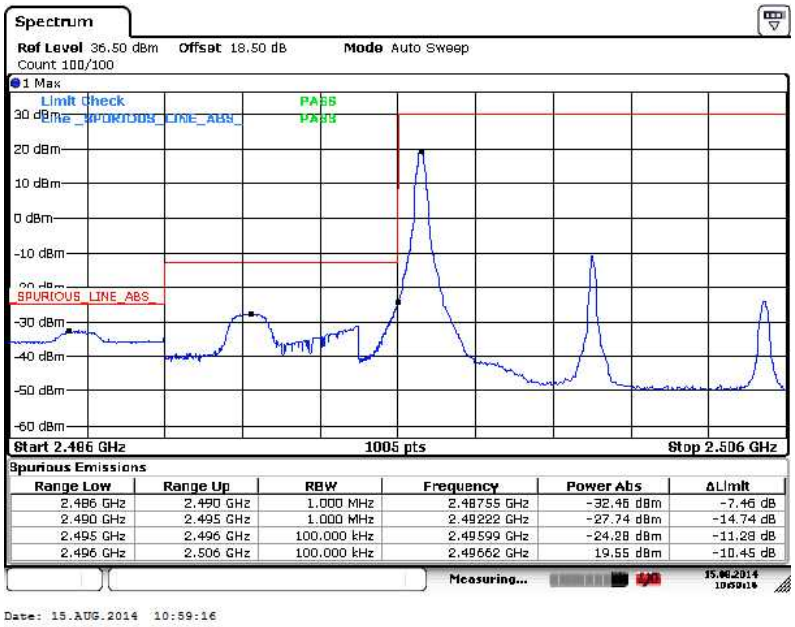
Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



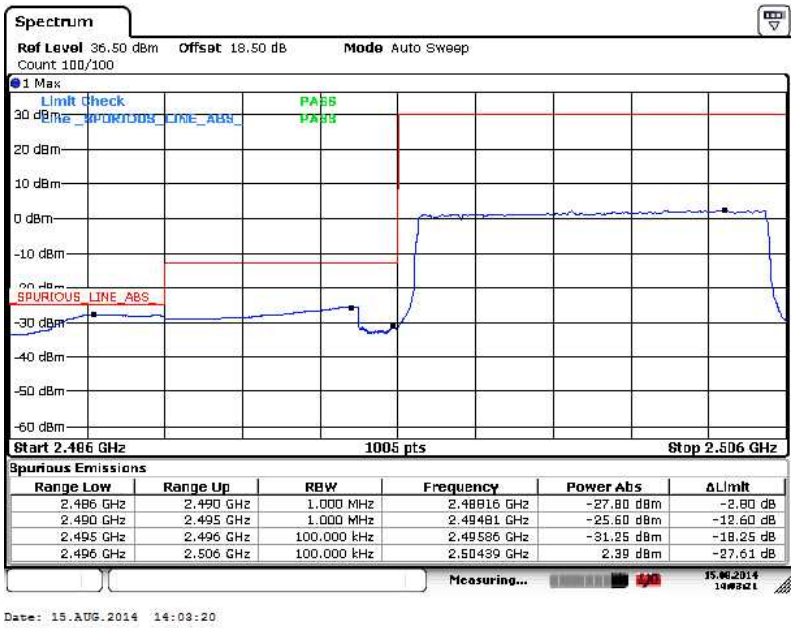
Date: 25.AUG.2014 11:21:12

Band :	LTE Band 41	Band Width :	10MHz / QPSK

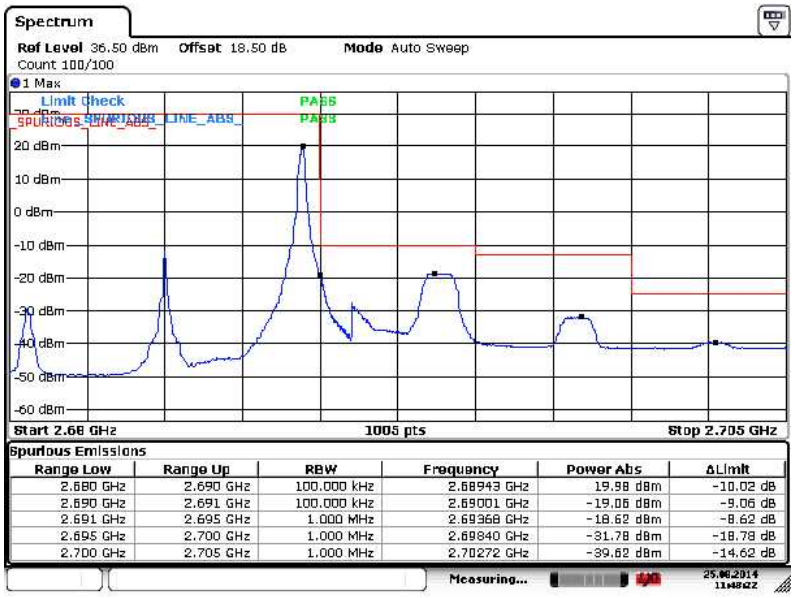
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

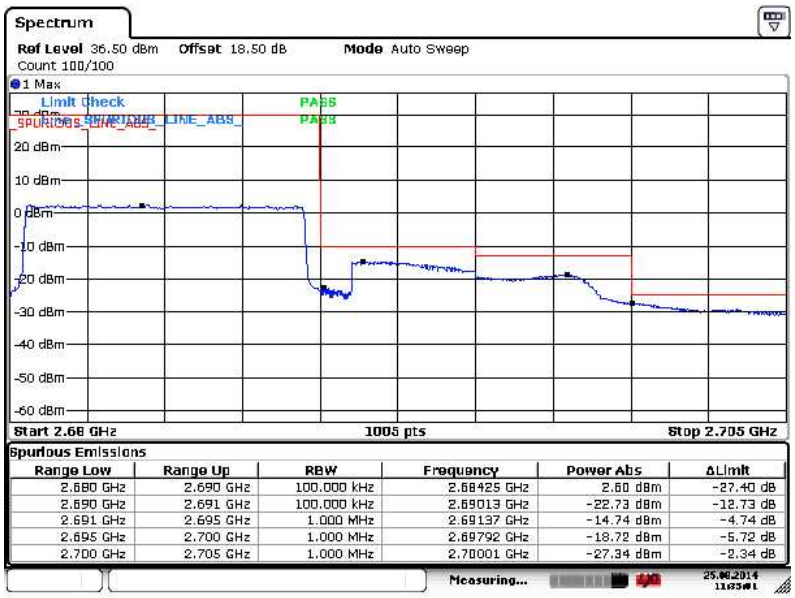


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49



Date: 25.AUG.2014 11:48:22

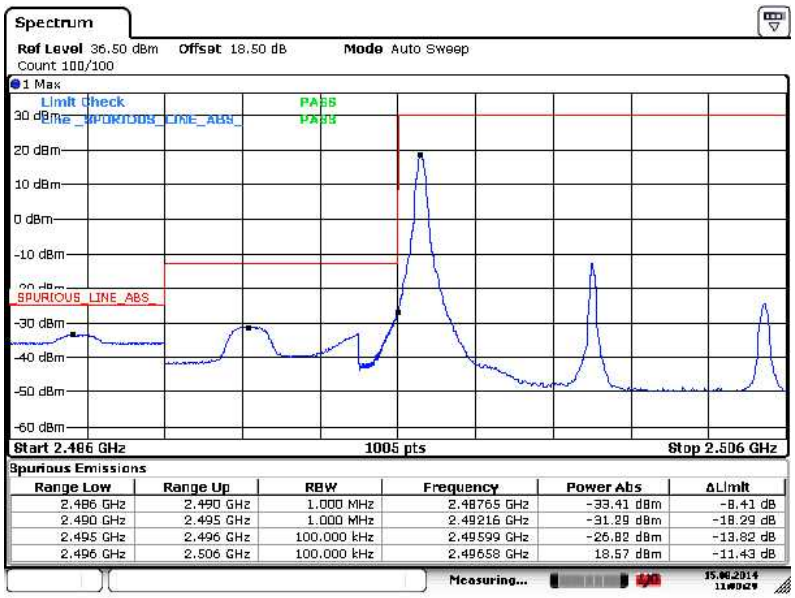
Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0



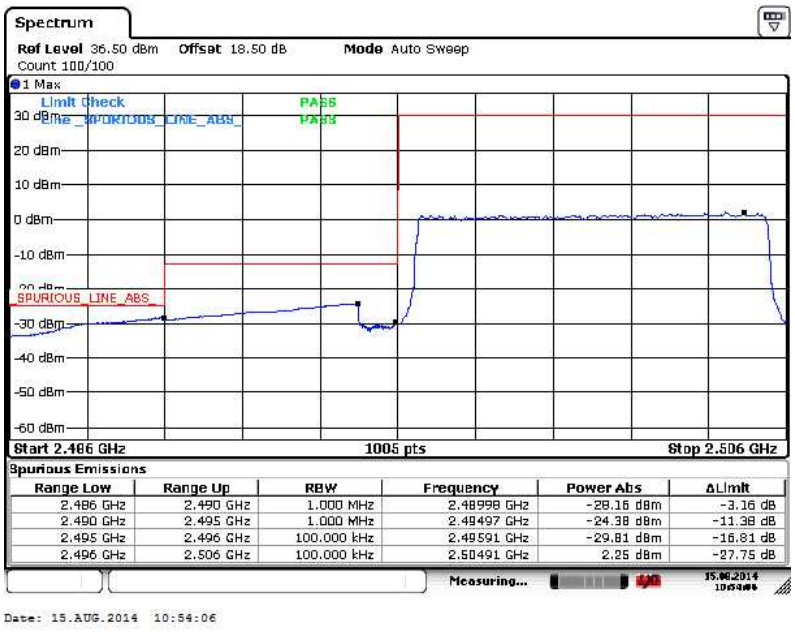
Date: 25.AUG.2014 11:35:01

Band :	LTE Band 41	Band Width :	10MHz / 16QAM

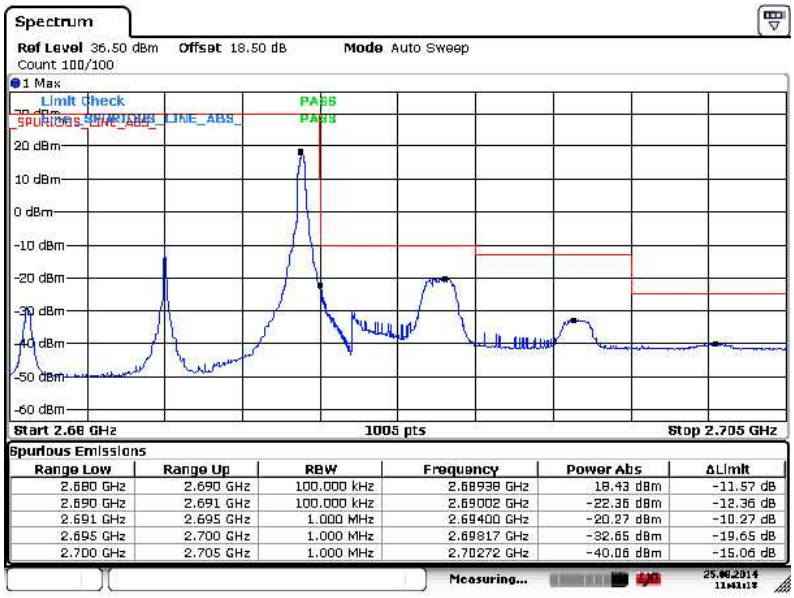
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

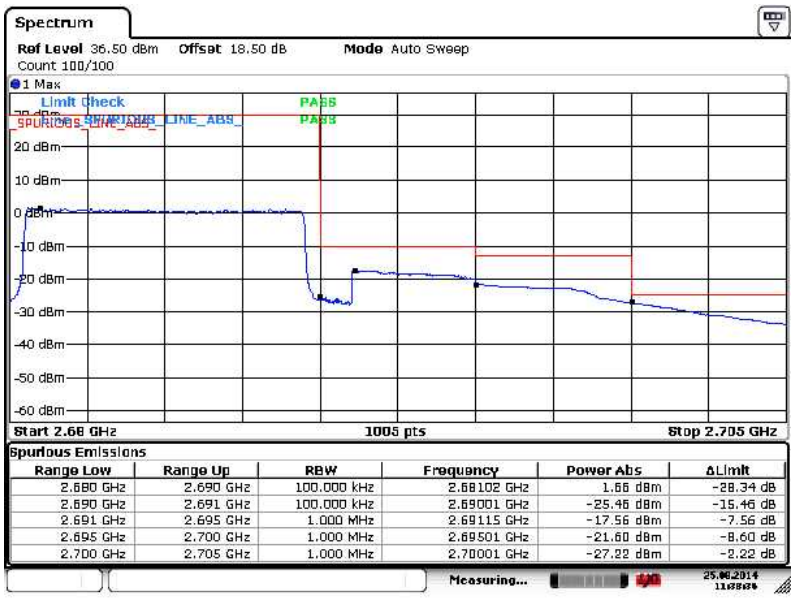


Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 49



Date: 25.AUG.2014 11:41:18

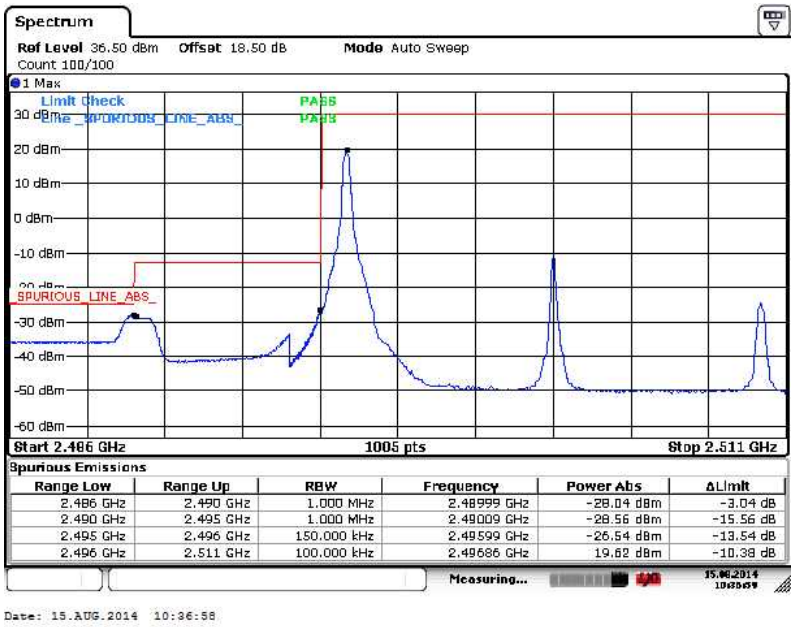
Higher Band Edge Plot for 16QAM -RB Size 50, RB Offset 0



Date: 25.AUG.2014 11:38:36

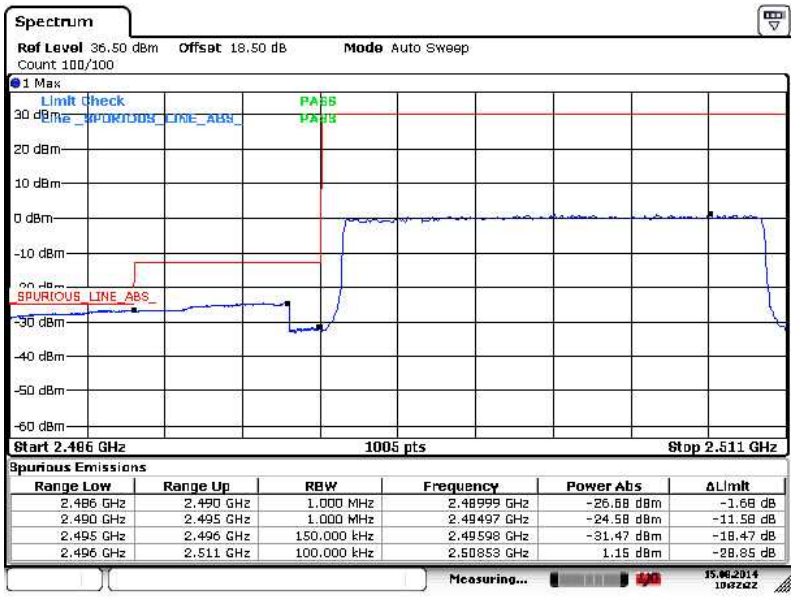
Band :	LTE Band 41	Band Width :	15MHz / QPSK

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



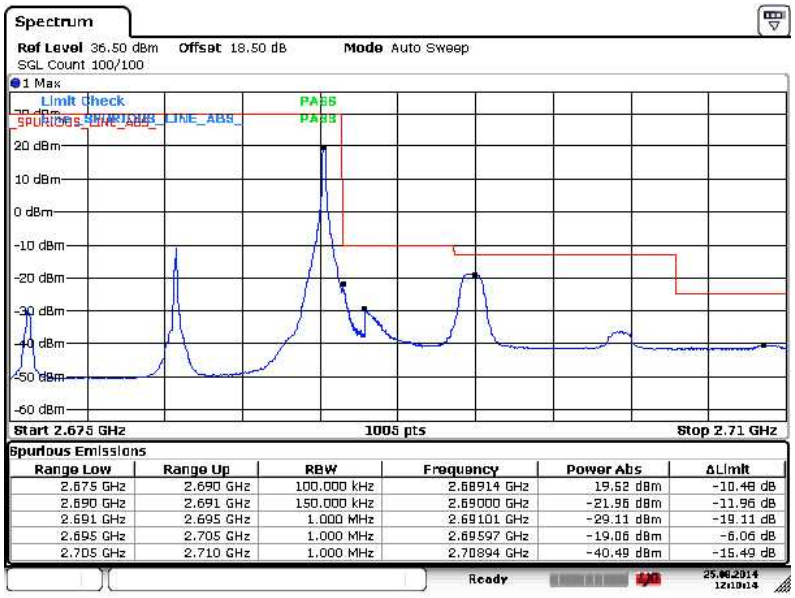
Date: 15.AUG.2014 10:36:58

Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



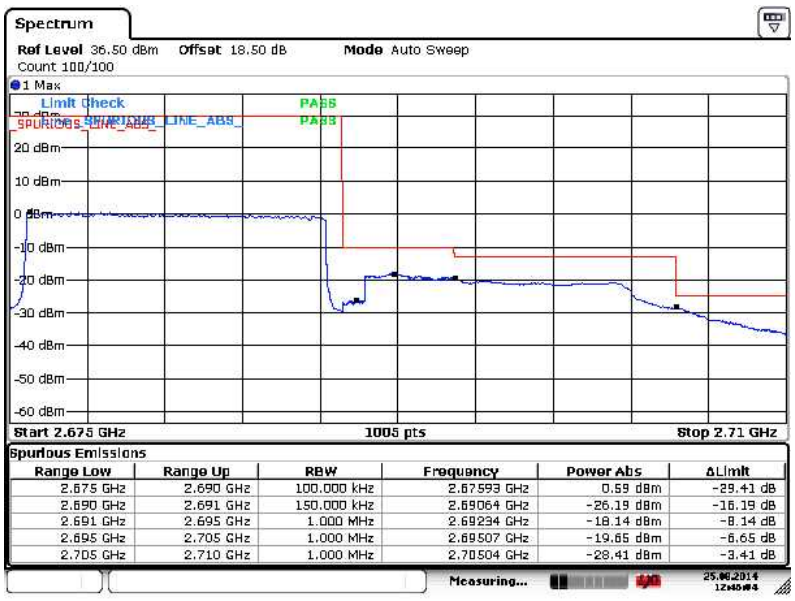
Date: 15.AUG.2014 10:32:22

Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74



Date: 25.AUG.2014 12:10:14

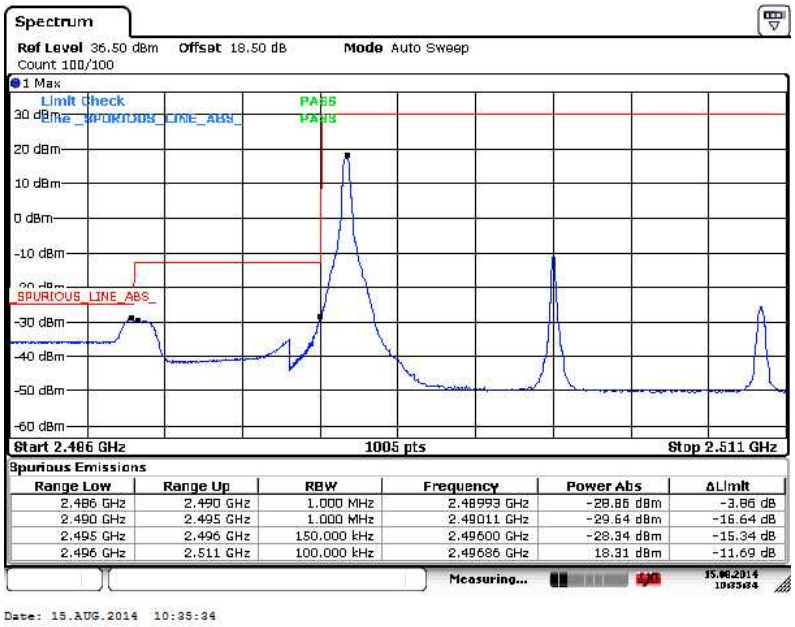
Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0



Date: 25.AUG.2014 12:46:04

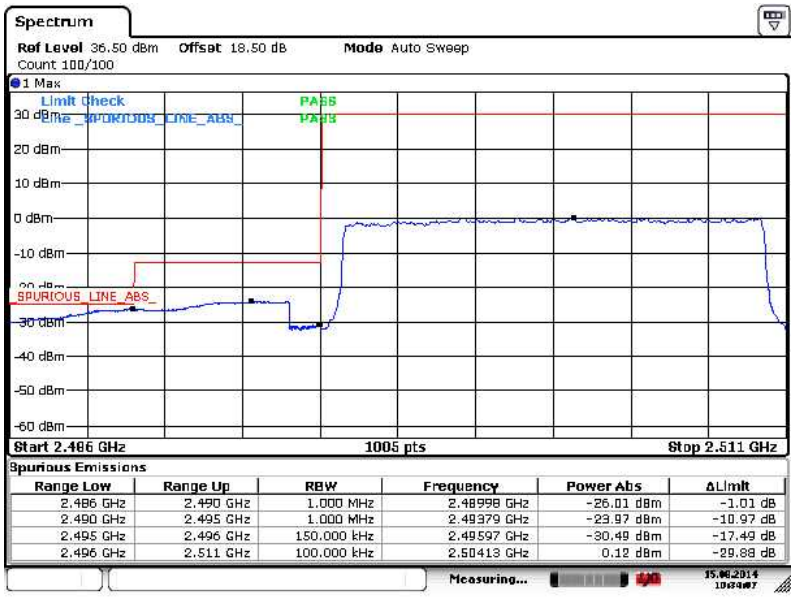
Band :	LTE Band 41	Band Width :	15MHz / 16QAM

Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



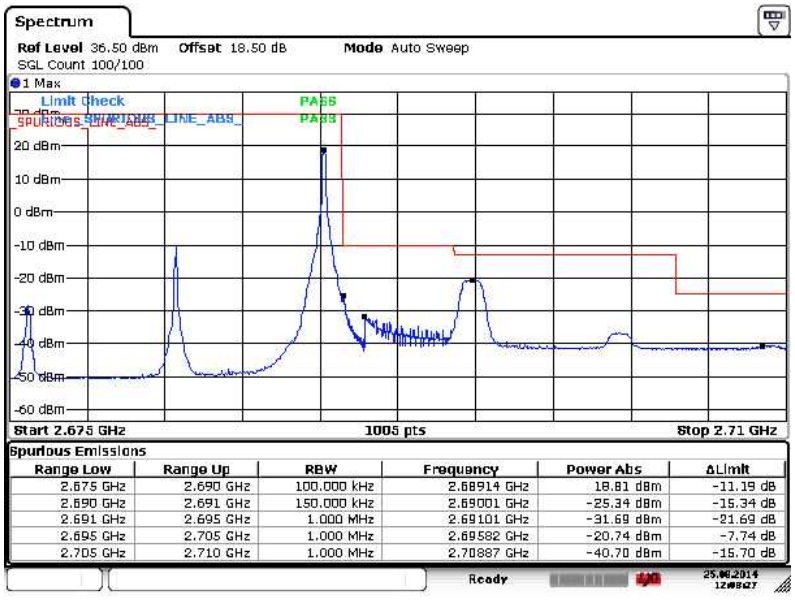
Date: 15.AUG.2014 10:35:34

Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



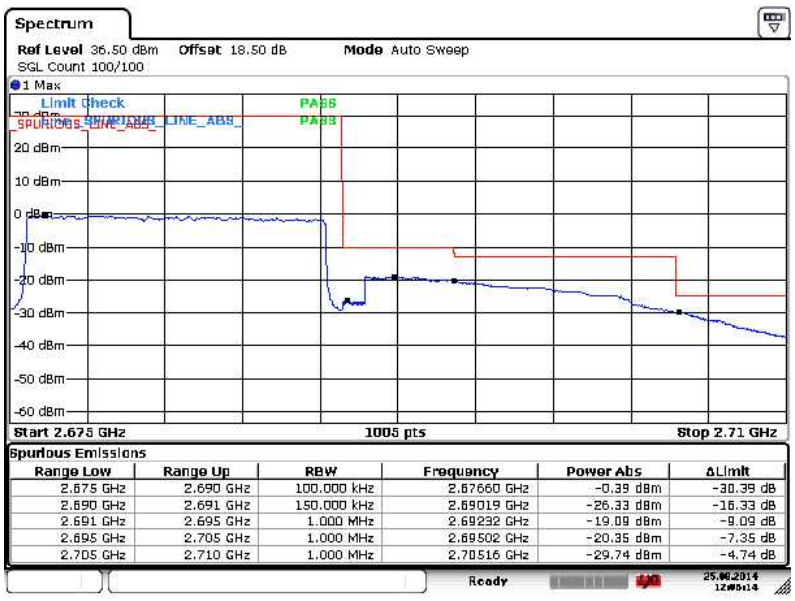
Date: 15.AUG.2014 10:34:06

Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 74



Date: 25.AUG.2014 12:08:27

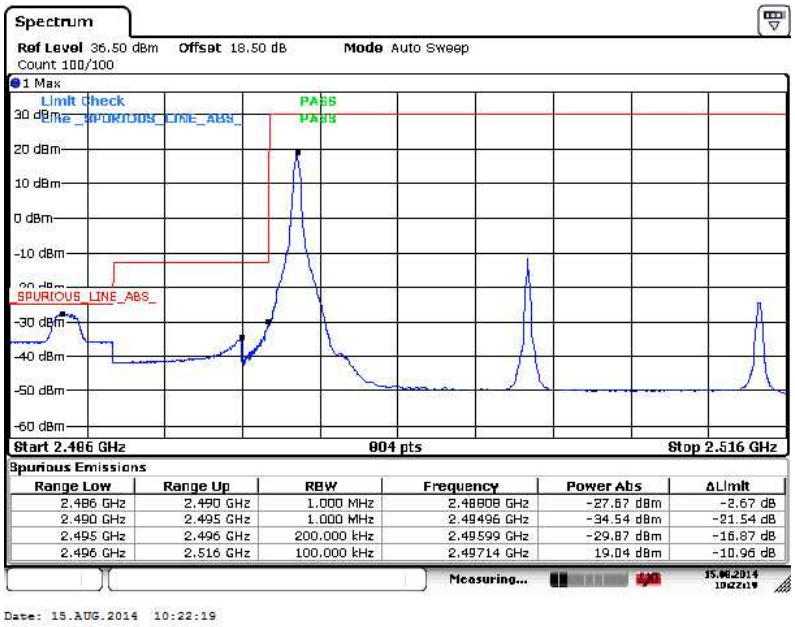
Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



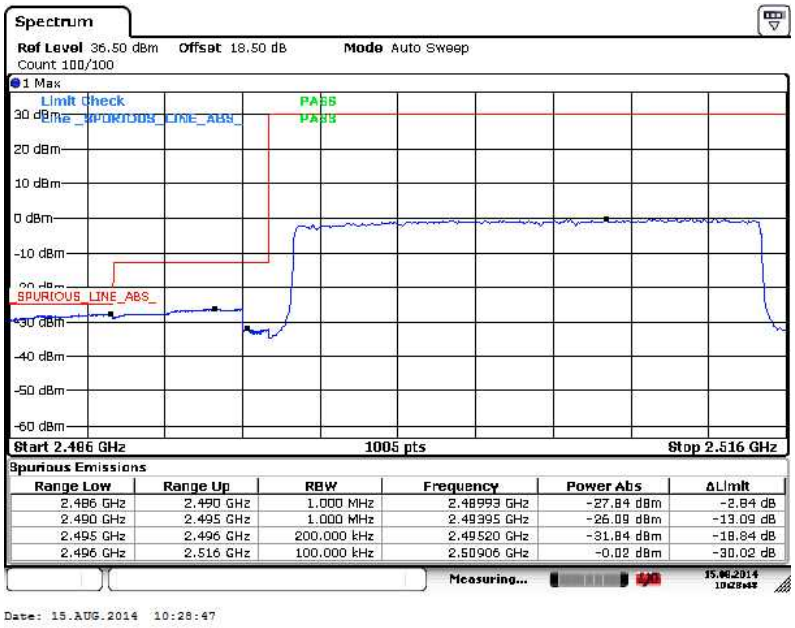
Date: 25.AUG.2014 12:06:14

Band :	LTE Band 41	Band Width :	20MHz / QPSK

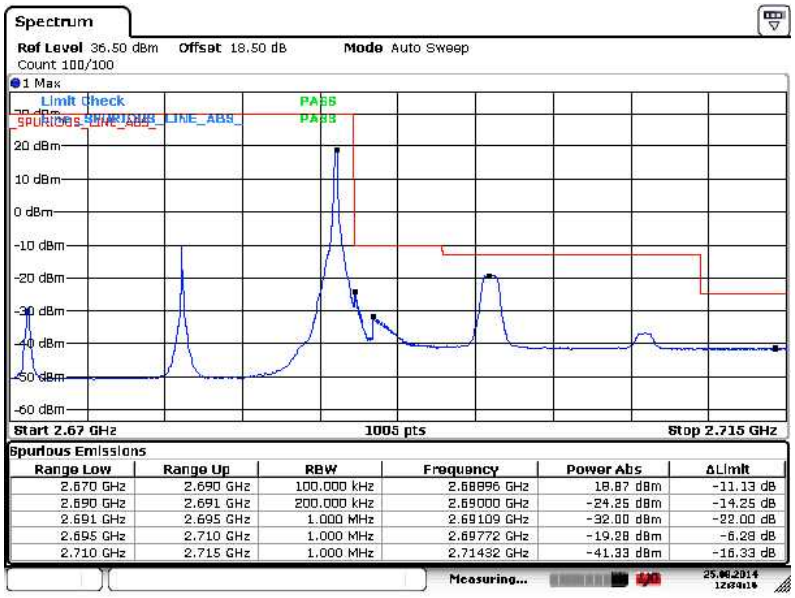
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0

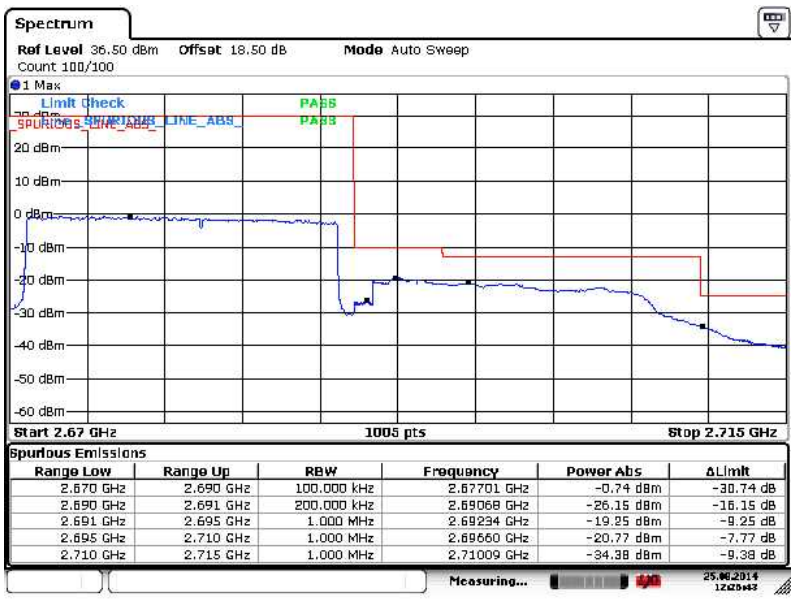


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99



Date: 25.AUG.2014 12:34:16

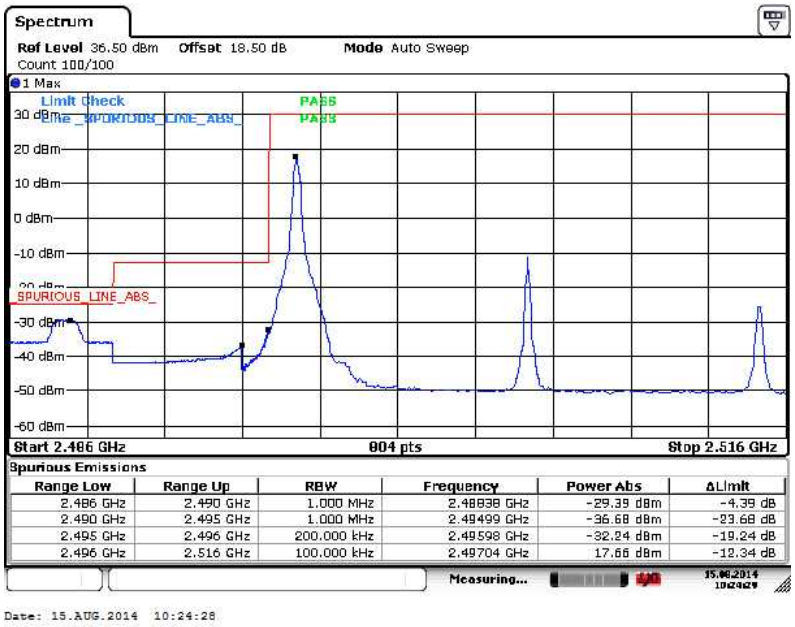
Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0



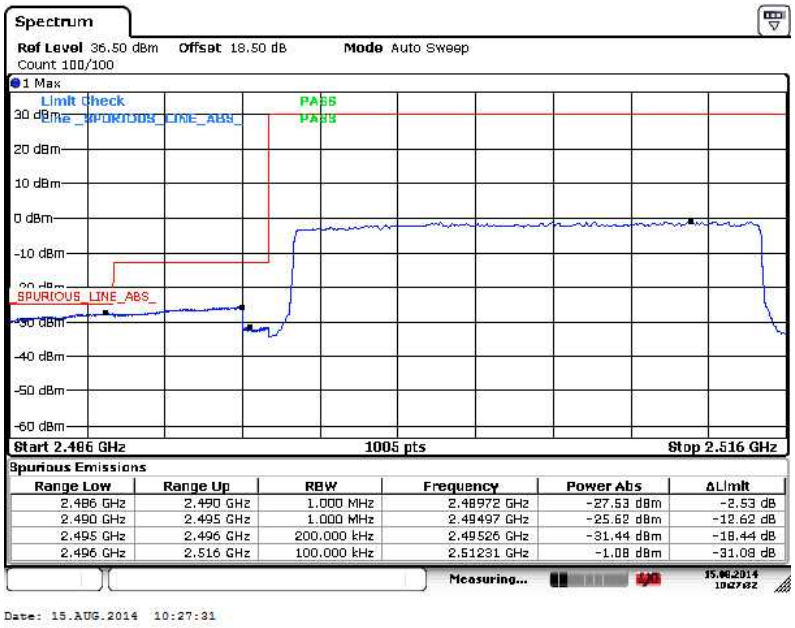
Date: 25.AUG.2014 12:26:43

Band :	LTE Band 41	Band Width :	20MHz / 16QAM

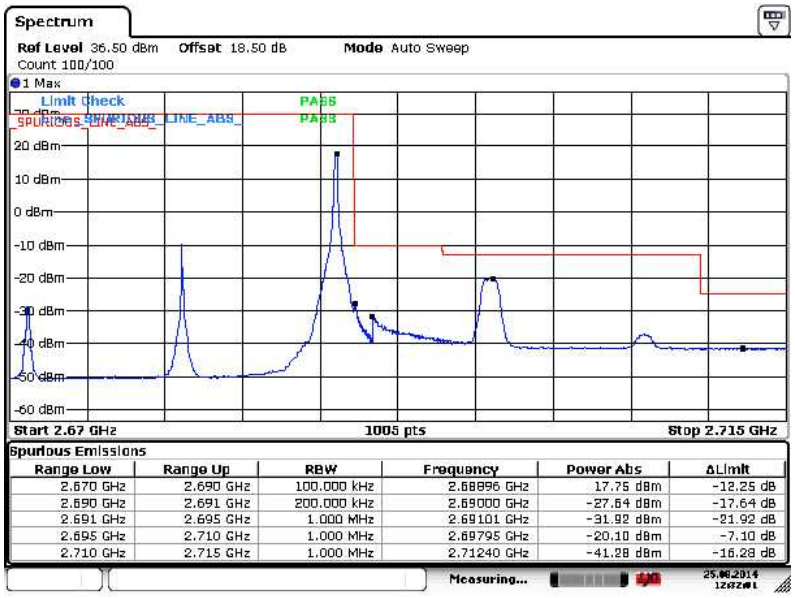
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0

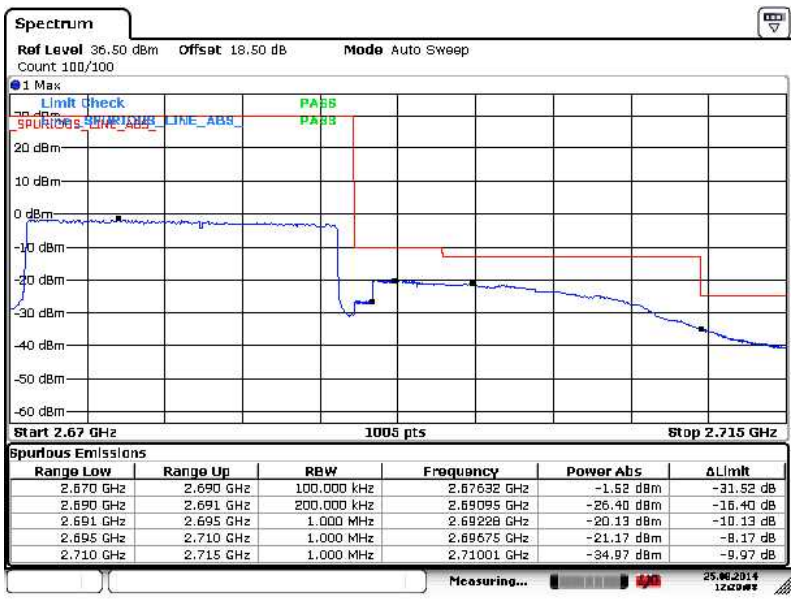


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99



Date: 25.AUG.2014 12:32:01

Higher Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



Date: 25.AUG.2014 12:29:08

3.6 Conducted Spurious Emission Measurement

3.6.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10^{th} harmonic.

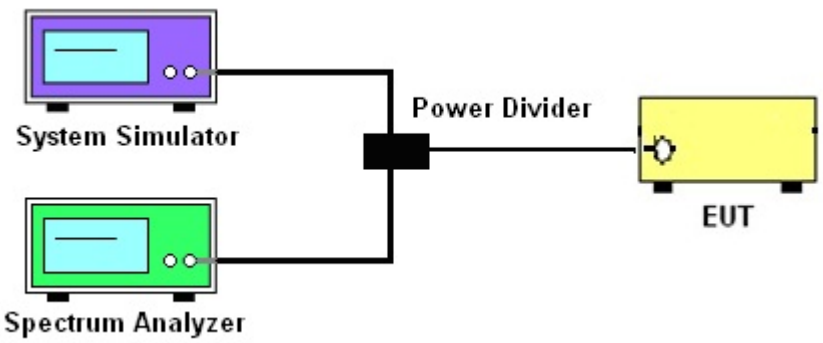
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [55 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
   = -25dBm.

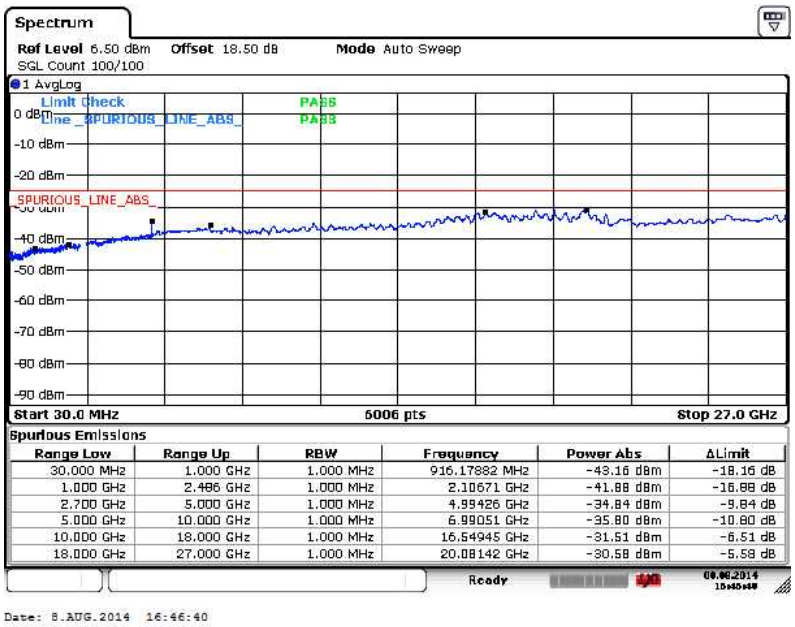
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

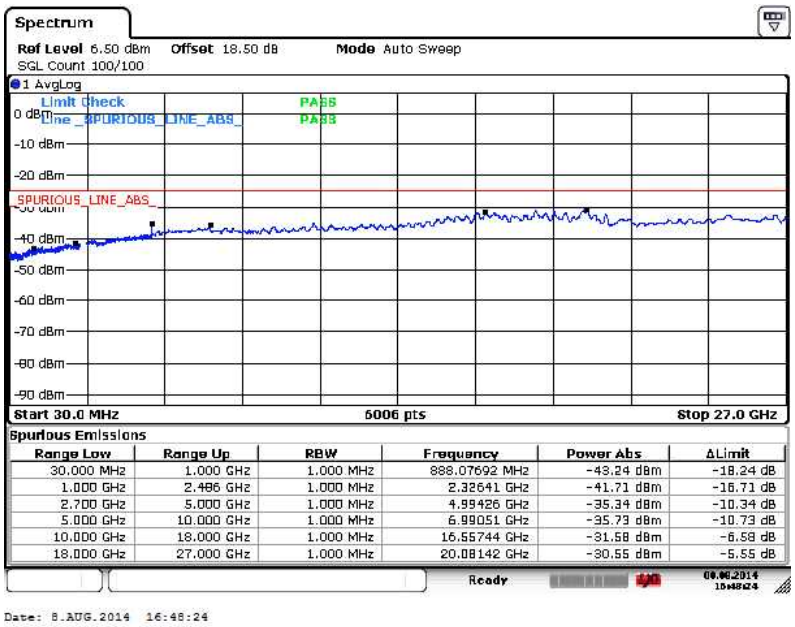
Band :	LTE Band 41	Channel :	CH39675 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 12)



Date: 8.AUG.2014 16:46:40

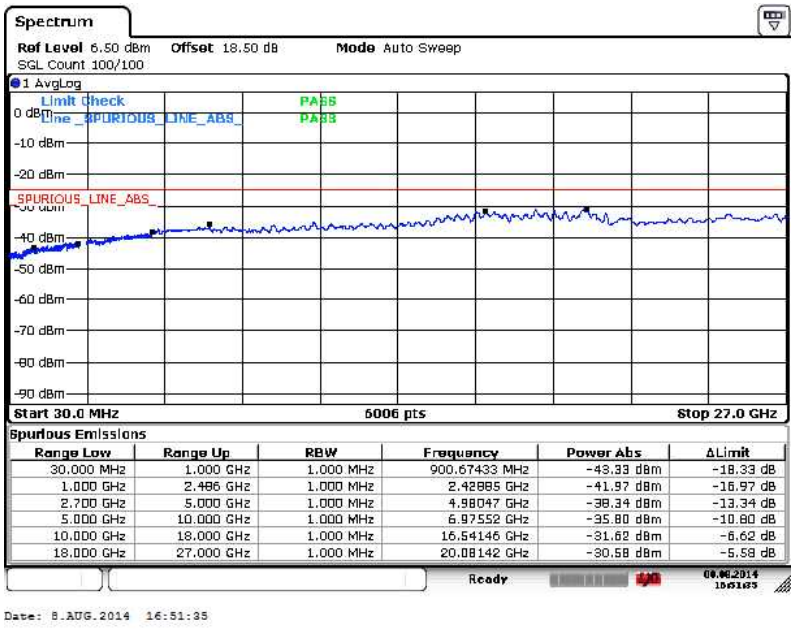
16QAM (RB Size 1, RB Offset 24)



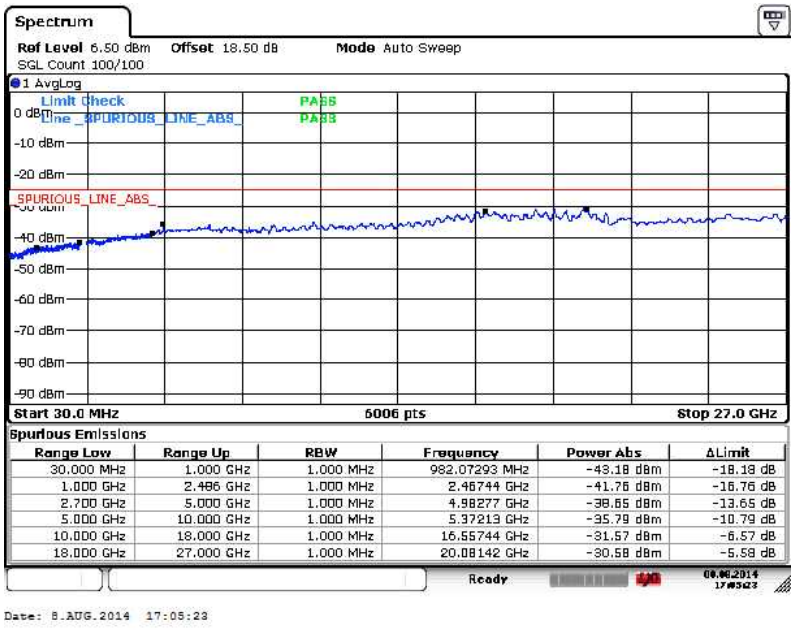
Date: 8.AUG.2014 16:48:24

Band :	LTE Band 41	Channel :	CH40620 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)

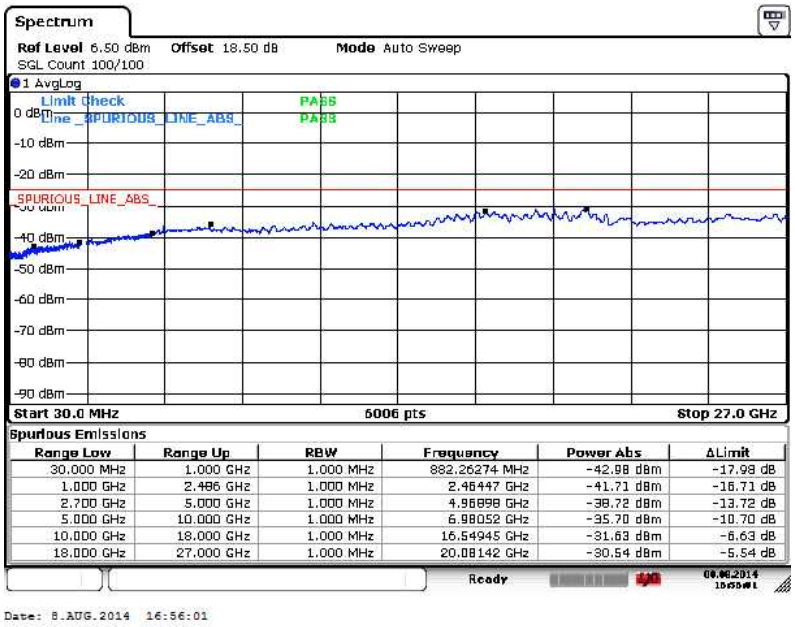


16QAM (RB Size 1, RB Offset 12)



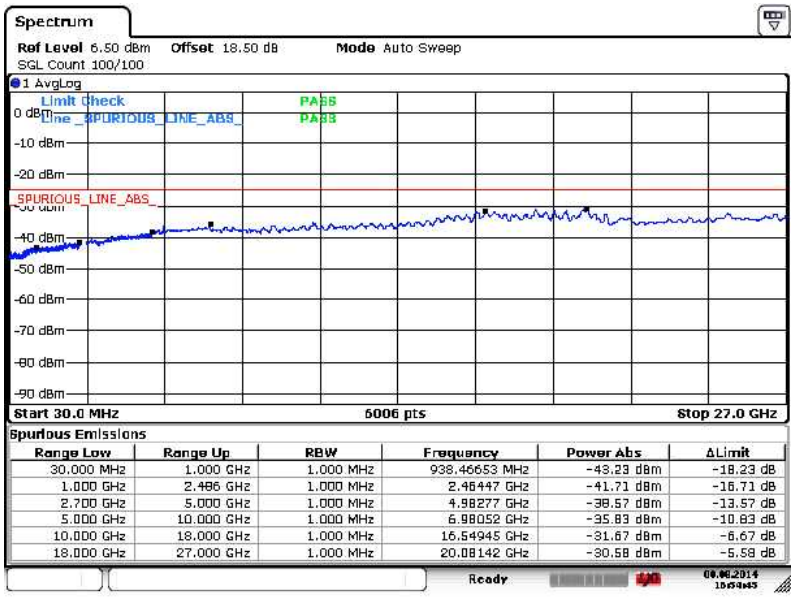
Band :	LTE Band 41	Channel :	CH41565 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



Date: 8.AUG.2014 16:56:01

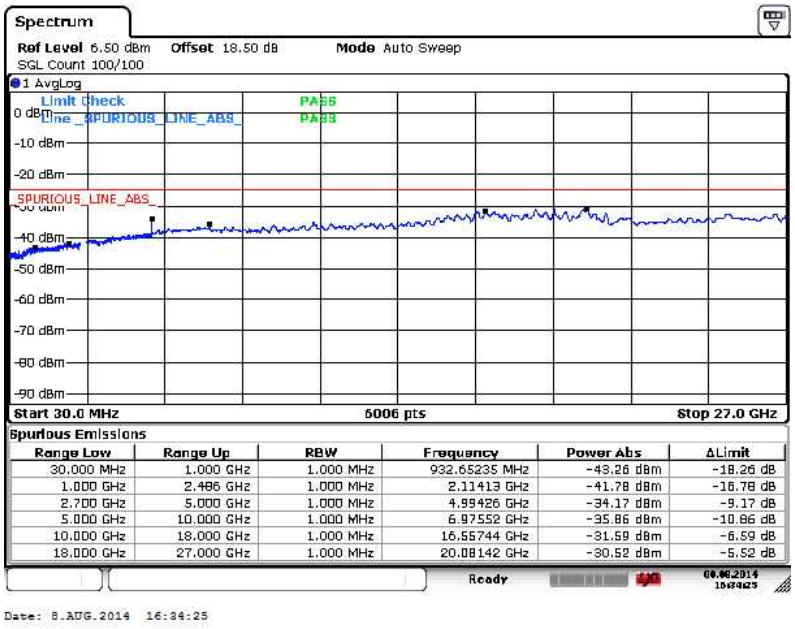
16QAM (RB Size 1, RB Offset 24)



Date: 8.AUG.2014 16:54:46

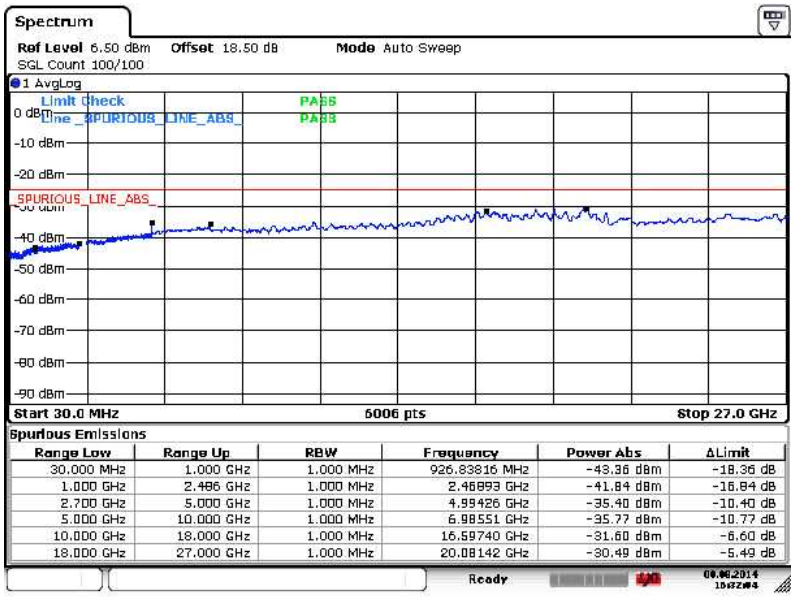
Band :	LTE Band 41	Channel :	CH39700 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 49)



Date: 8.AUG.2014 16:34:25

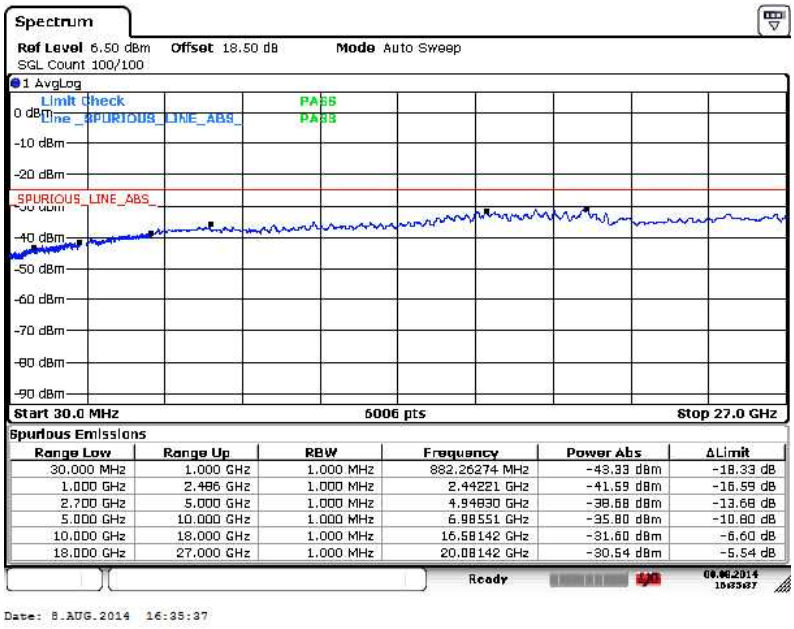
16QAM (RB Size 1, RB Offset 49)



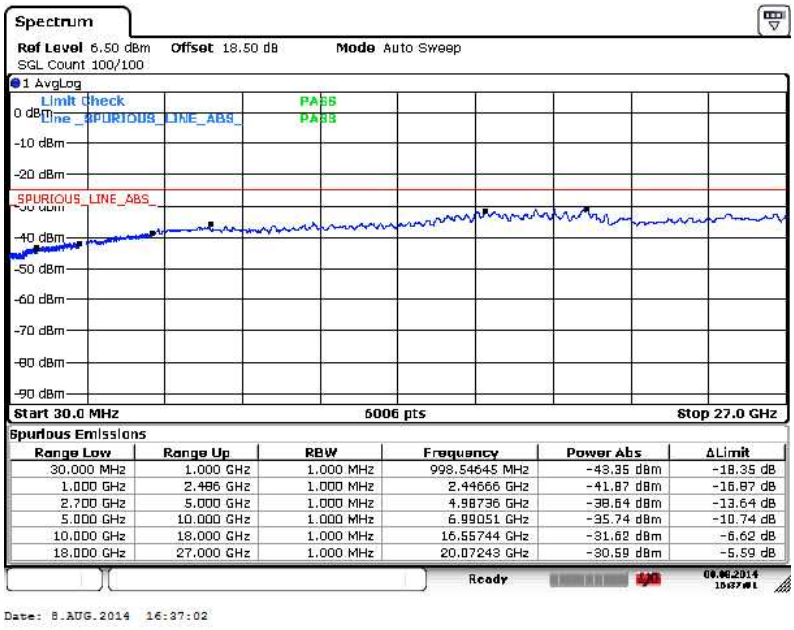
Date: 8.AUG.2014 16:32:04

Band :	LTE Band 41	Channel :	CH40620 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)

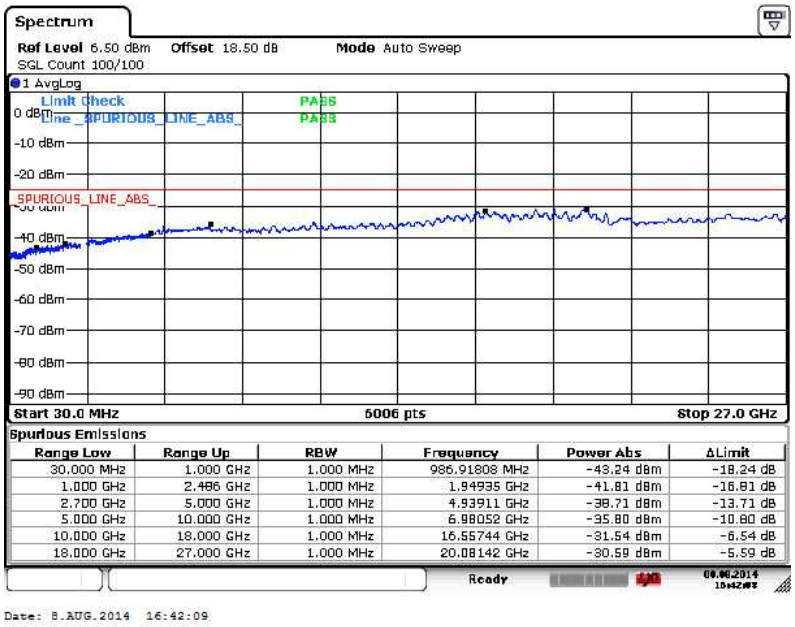


16QAM (RB Size 1, RB Offset 0)



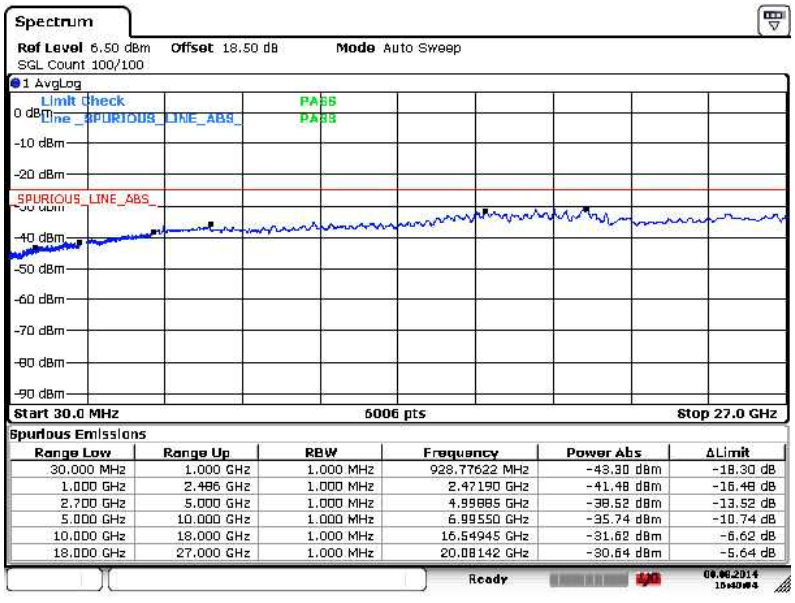
Band :	LTE Band 41	Channel :	CH41540 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 49)



Date: 8.AUG.2014 16:42:09

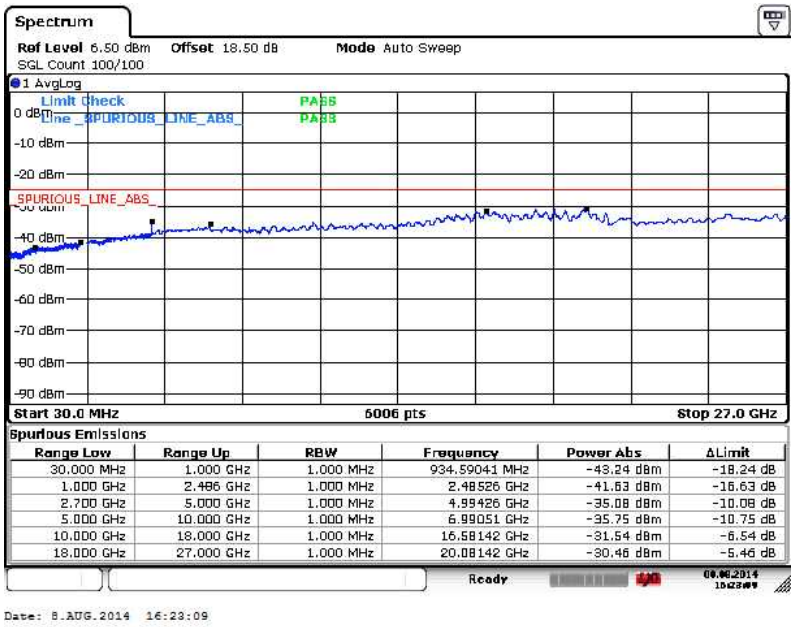
16QAM (RB Size 1, RB Offset 0)



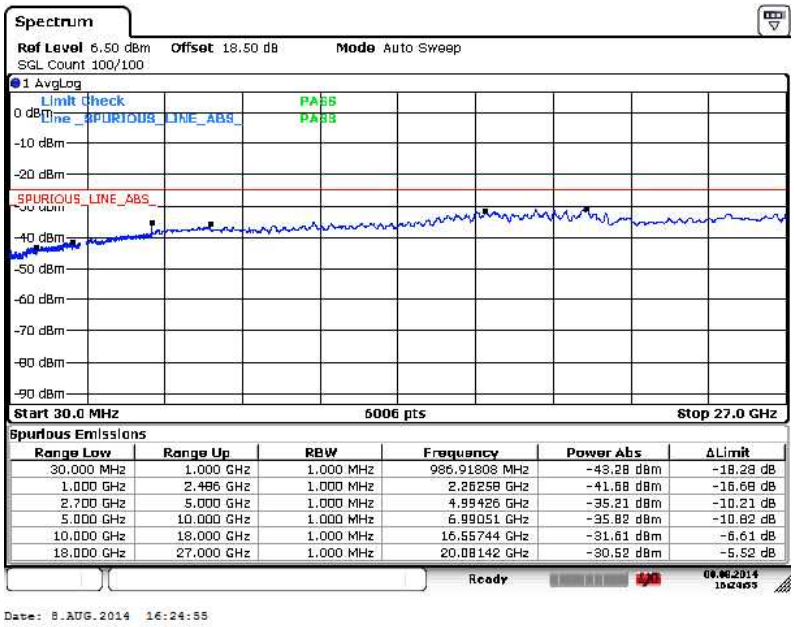
Date: 8.AUG.2014 16:40:04

Band :	LTE Band 41	Channel :	CH39725 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)

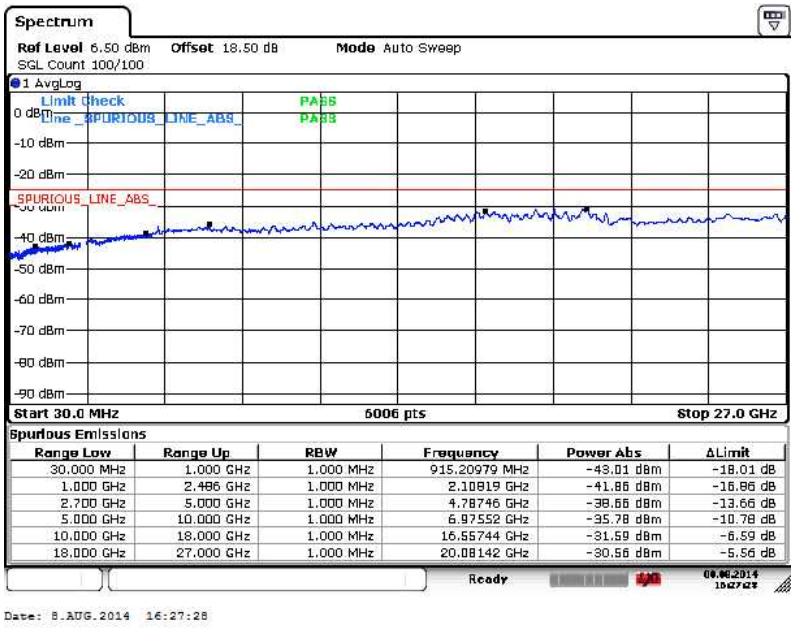


16QAM (RB Size 1, RB Offset 37)



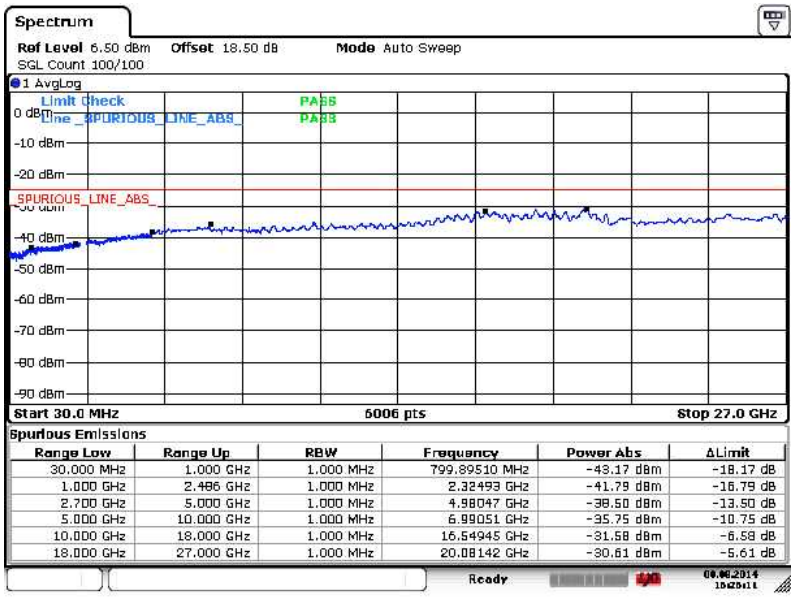
Band :	LTE Band 41	Channel :	CH40620 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 74)



Date: 8.AUG.2014 16:27:28

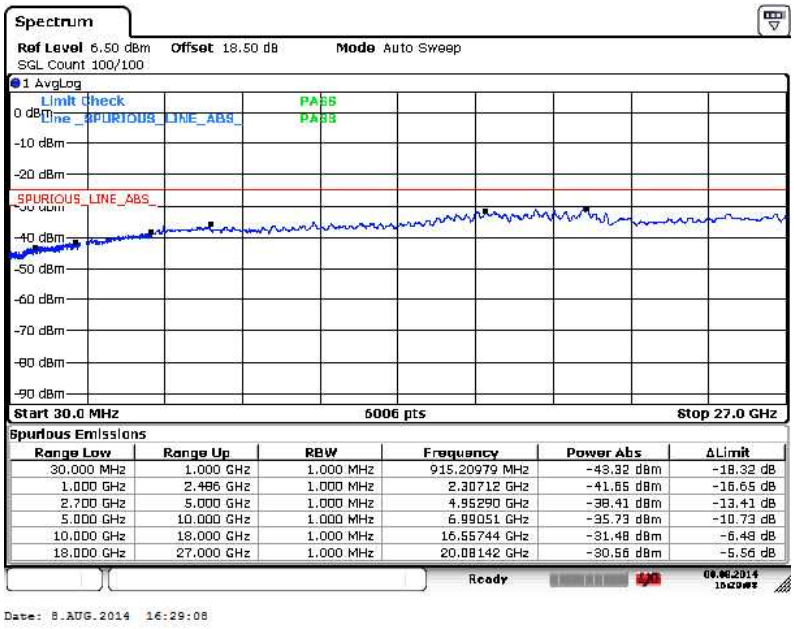
16QAM (RB Size 1, RB Offset 74)



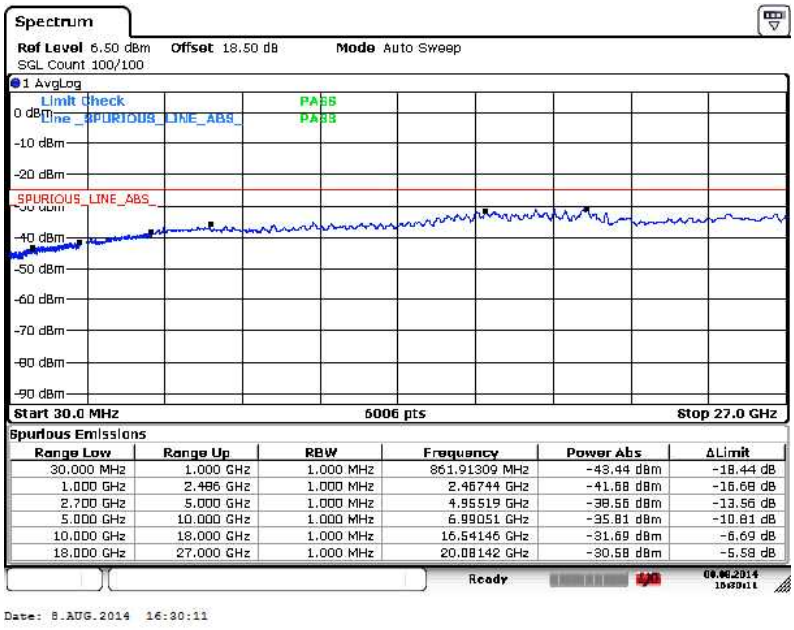
Date: 8.AUG.2014 16:26:11

Band :	LTE Band 41	Channel :	CH41515 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 37)

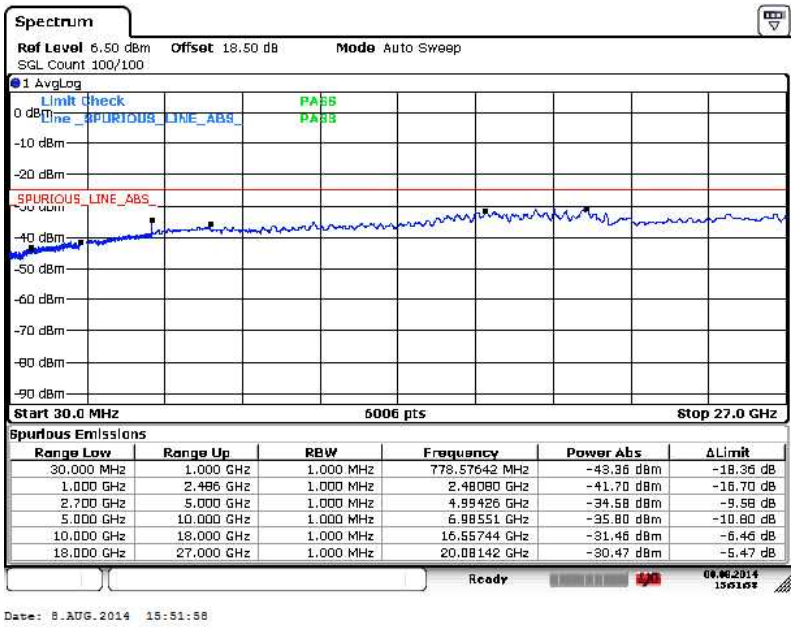


16QAM (RB Size 1, RB Offset 37)

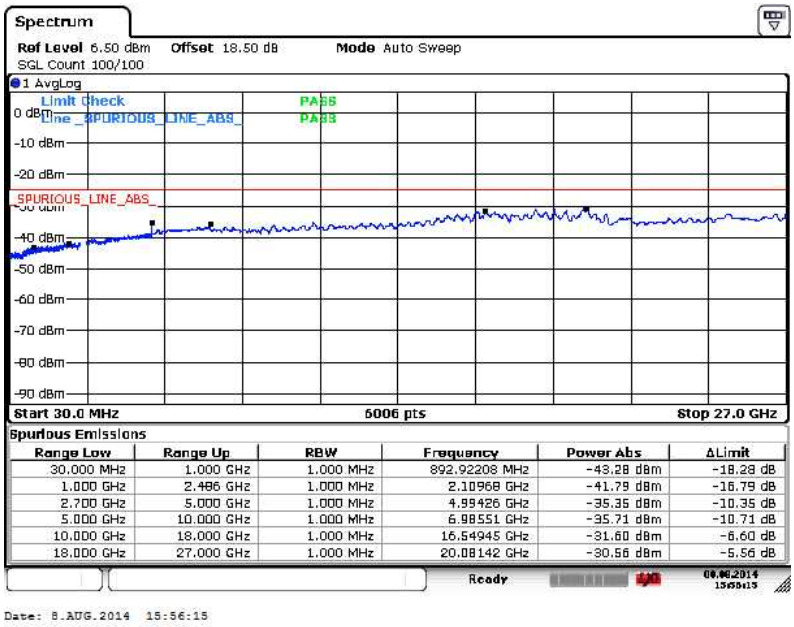


Band :	LTE Band 41	Channel :	CH39750 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 99)

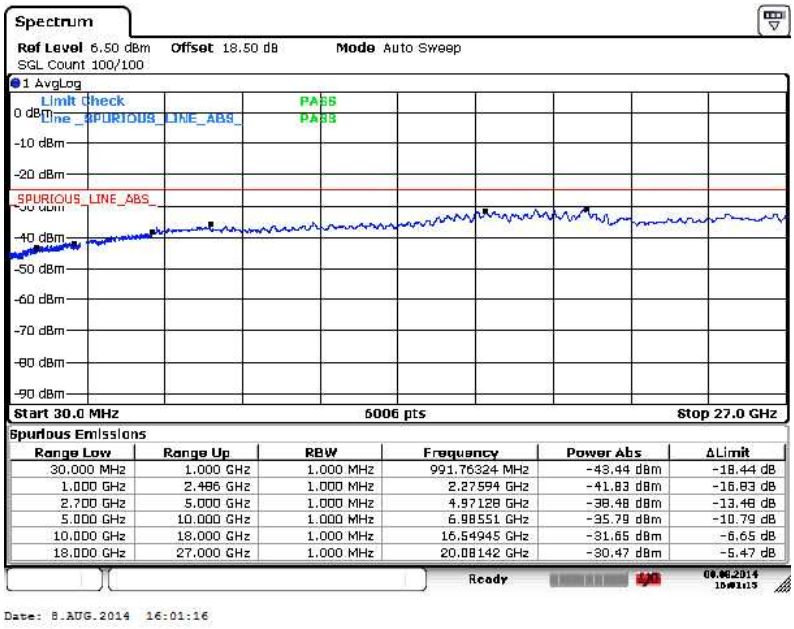


16QAM (RB Size 1, RB Offset 99)



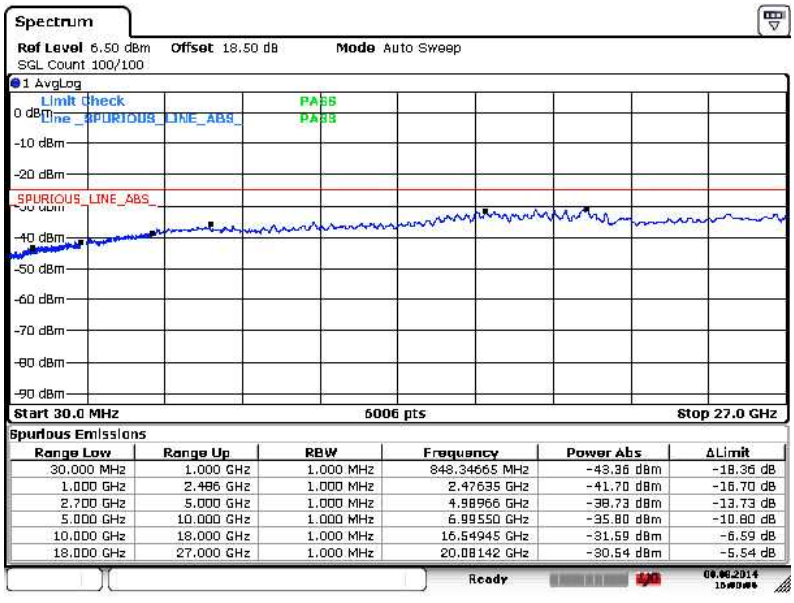
Band :	LTE Band 41	Channel :	CH40620 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 99)



Date: 8.AUG.2014 16:01:16

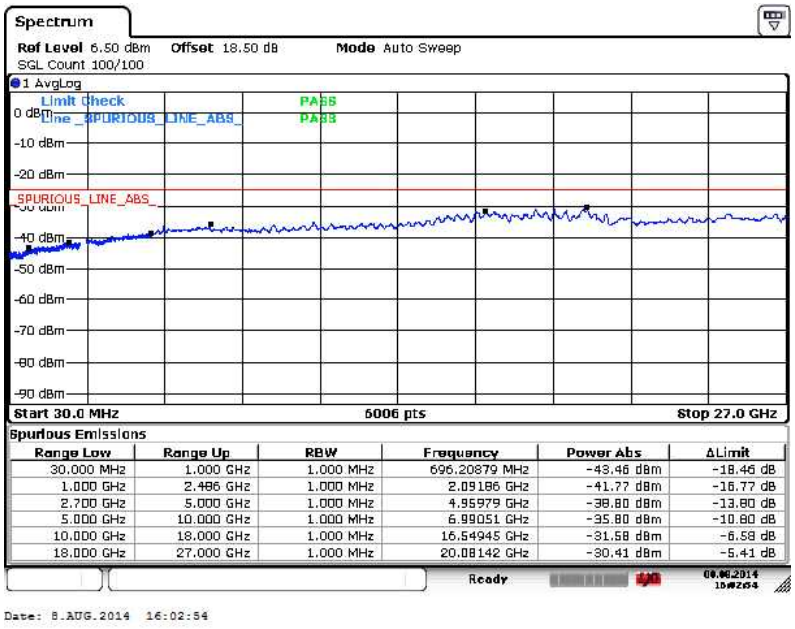
16QAM (RB Size 1, RB Offset 99)



Date: 8.AUG.2014 16:00:06

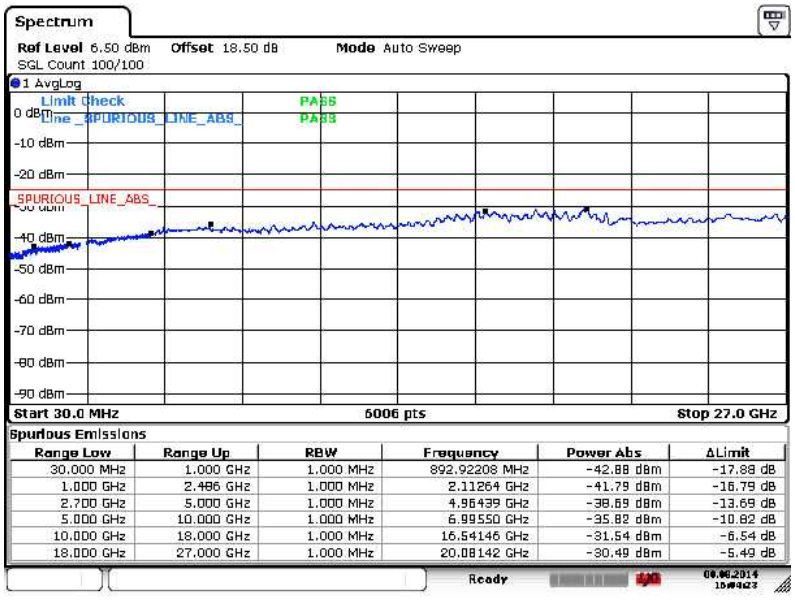
Band :	LTE Band 41	Channel :	CH41490 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 99)



Date: 8.AUG.2014 16:02:54

16QAM (RB Size 1, RB Offset 0)



Date: 8.AUG.2014 16:04:23

3.7 Radiated Spurious Emission Measurement

3.7.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.7.2 Measuring Instruments

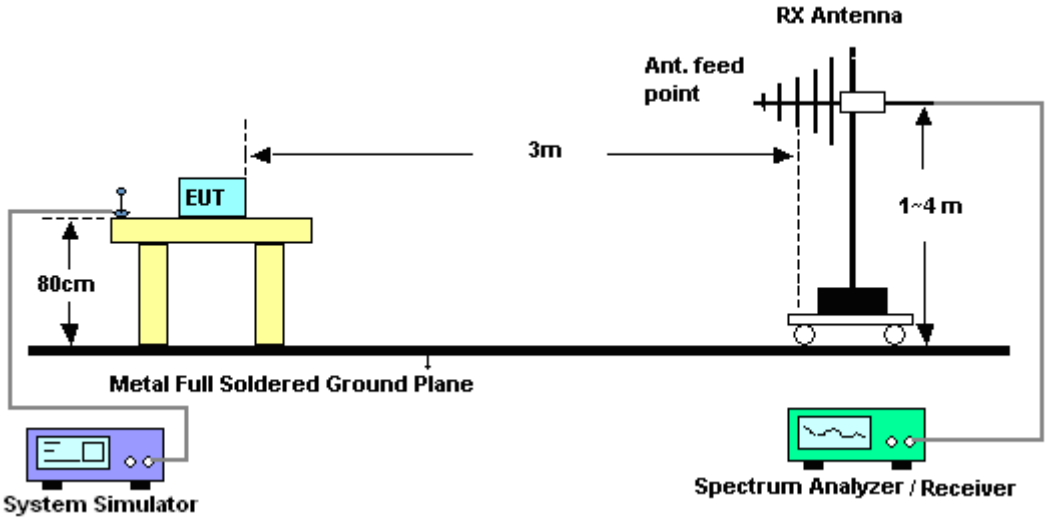
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

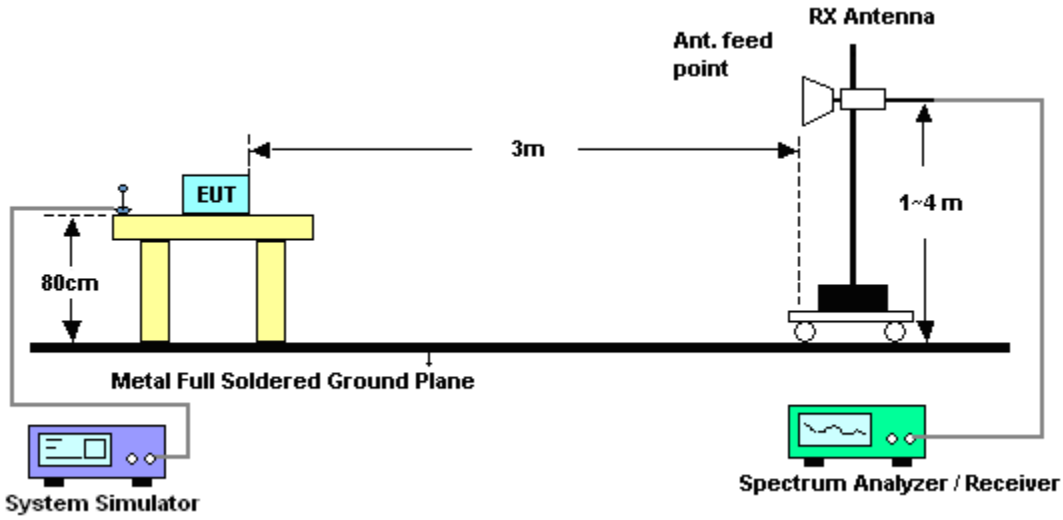
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
    = -25dBm.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.7.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2498.5	Channel :	39675 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4992.68	-58.13	-25	-33.13	-69.07	-38.20	1.2	7.60	H	Pass
7489.02	-56.25	-25	-31.25	-75.06	-68.60	1.56	9.90	H	Pass
9985.36	-52.74	-25	-27.74	-76.26	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2498.5	Channel :	39675 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4992.68	-56.89	-25.00	-31.89	-69.61	-43.20	1.2	7.60	V	Pass
7489.02	-56.81	-25.00	-31.81	-76.06	-70.30	1.56	9.90	V	Pass
9985.36	-54.05	-25.00	-29.05	-77.28	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5181.68	-60.71	-25	-35.71	-71.65	-38.20	1.2	7.60	H	Pass
7772.52	-57.22	-25	-32.22	-76.03	-68.60	1.56	9.90	H	Pass
10722.36	-53.96	-25	-28.96	-77.48	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5181.68	-55.16	-25.00	-30.16	-67.88	-43.20	1.2	7.60	V	Pass
7772.52	-57.30	-25.00	-32.30	-76.55	-70.30	1.56	9.90	V	Pass
10722.36	-55.12	-25.00	-30.12	-78.35	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2687.5	Channel :	41565 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5370.68	-56.21	-25	-31.21	-67.15	-38.20	1.2	7.60	H	Pass
8056.02	-51.88	-25	-26.88	-70.69	-68.60	1.56	9.90	H	Pass
10741.36	-54.45	-25	-29.45	-77.97	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2687.5	Channel :	41565 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5370.68	-50.10	-25.00	-25.10	-62.82	-43.20	1.2	7.60	V	Pass
8056.02	-56.54	-25.00	-31.54	-75.79	-70.30	1.56	9.90	V	Pass
10741.36	-54.33	-25.00	-29.33	-77.56	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	**Temperature :**	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Kaer Huang	**Polarization :**	Horizontal
Frequency :	2501	**Channel :**	39700 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4993.18	-57.79	-25	-32.79	-68.73	-38.20	1.2	7.60	H	Pass
7489.77	-55.23	-25	-30.23	-74.04	-68.60	1.56	9.90	H	Pass
9986.36	-53.97	-25	-28.97	-77.49	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	**Temperature :**	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Kaer Huang	**Polarization :**	Vertical
Frequency :	2501	**Channel :**	39700 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4993.18	-54.17	-25	-29.17	-66.89	-43.20	1.2	7.60	V	Pass
7489.77	-56.50	-25	-31.50	-75.75	-70.30	1.56	9.90	V	Pass
9986.36	-54.26	-25	-29.26	-77.49	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5177.18	-60.80	-25	-35.80	-71.74	-38.20	1.2	7.60	H	Pass
7765.77	-55.42	-25	-30.42	-74.23	-68.60	1.56	9.90	H	Pass
10354.36	-53.69	-25	-28.69	-77.21	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5177.18	-55.75	-25	-30.75	-68.47	-43.20	1.2	7.60	V	Pass
7765.77	-56.12	-25	-31.12	-75.37	-70.30	1.56	9.90	V	Pass
10354.36	-53.94	-25	-28.94	-77.17	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2685	Channel :	41540 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5361.18	-55.96	-25	-30.96	-66.90	-38.20	1.2	7.60	H	Pass
8041.77	-53.90	-25	-28.90	-72.71	-68.60	1.56	9.90	H	Pass
10722.36	-53.99	-25	-28.99	-77.51	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2685	Channel :	41540 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5361.18	-51.92	-25	-26.92	-64.64	-43.20	1.2	7.60	V	Pass
8041.77	-55.95	-25	-30.95	-75.2	-70.30	1.56	9.90	V	Pass
10722.36	-54.77	-25	-29.77	-78	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	**Temperature :**	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Kaer Huang	**Polarization :**	Horizontal
Frequency :	2503.5	**Channel :**	39725 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4993.68	-57.02	-25	-32.02	-67.96	-38.20	1.2	7.60	H	Pass
7490.52	-55.24	-25	-30.24	-74.05	-68.60	1.56	9.90	H	Pass
9987.36	-54.58	-25	-29.58	-78.10	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	**Temperature :**	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Kaer Huang	**Polarization :**	Vertical
Frequency :	2503.5	**Channel :**	39725 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4993.68	-56.28	-25	-31.28	-69	-43.20	1.2	7.60	V	Pass
7490.52	-57.16	-25	-32.16	-76.41	-70.30	1.56	9.90	V	Pass
9987.36	-53.64	-25	-28.64	-76.87	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5172.68	-59.57	-25	-34.57	-70.51	-38.20	1.2	7.60	H	Pass
7759.02	-56.68	-25	-31.68	-75.49	-68.60	1.56	9.90	H	Pass
10344.00	-54.00	-25	-29.00	-77.52	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5172.68	-55.34	-25	-30.34	-68.06	-43.20	1.2	7.60	V	Pass
7759.02	-56.80	-25	-31.80	-76.05	-70.30	1.56	9.90	V	Pass
10344	-54.66	-25	-29.66	-77.89	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2682.5	Channel :	41515 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5351.68	-57.74	-25	-32.74	-68.68	-38.20	1.2	7.60	H	Pass
8027.52	-54.04	-25	-29.04	-72.85	-68.60	1.56	9.90	H	Pass
10703.36	-53.75	-25	-28.75	-77.27	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2682.5	Channel :	41515 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5351.68	-52.60	-25	-27.60	-65.32	-43.20	1.2	7.60	V	Pass
8027.52	-57.13	-25	-32.13	-76.38	-70.30	1.56	9.90	V	Pass
10703.36	-54.37	-25	-29.37	-77.6	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2506	Channel :	39750 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4994.18	-57.50	-25	-32.50	-68.44	-38.20	1.2	7.60	H	Pass
7491.27	-54.53	-25	-29.53	-73.34	-68.60	1.56	9.90	H	Pass
9988.36	-53.94	-25	-28.94	-77.46	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2506	Channel :	39750 (Low)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
4994.18	-55.64	-25	-30.64	-68.36	-43.20	1.2	7.60	V	Pass
7491.27	-56.65	-25	-31.65	-75.9	-70.30	1.56	9.90	V	Pass
9988.36	-53.88	-25	-28.88	-77.11	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5168.18	-61.21	-25	-36.21	-72.15	-38.20	1.2	7.60	H	Pass
7752.27	-57.08	-25	-32.08	-75.89	-68.60	1.56	9.90	H	Pass
10336.36	-53.75	-25	-28.75	-77.27	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2593	Channel :	40620 (Middle)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5168.18	-57.27	-25	-32.27	-69.99	-43.20	1.2	7.60	V	Pass
7752.27	-57.14	-25	-32.14	-76.39	-70.30	1.56	9.90	V	Pass
10336.36	-53.93	-25	-28.93	-77.16	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Horizontal
Frequency :	2680	Channel :	41490 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5342.18	-61.06	-25	-36.06	-72.00	-38.20	1.2	7.60	H	Pass
8013.27	-53.99	-25	-28.99	-72.80	-68.60	1.56	9.90	H	Pass
10684.36	-53.92	-25	-28.92	-77.44	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 41	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Kaer Huang	Polarization :	Vertical
Frequency :	2680	Channel :	41490 (High)
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5342.18	-54.55	-25	-29.55	-67.27	-43.20	1.2	7.60	V	Pass
8013.27	-57.40	-25	-32.40	-76.65	-70.30	1.56	9.90	V	Pass
10684.36	-54.59	-25	-29.59	-77.82	-64.60	1.78	11.60	V	Pass

3.8 Frequency Stability Measurement

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

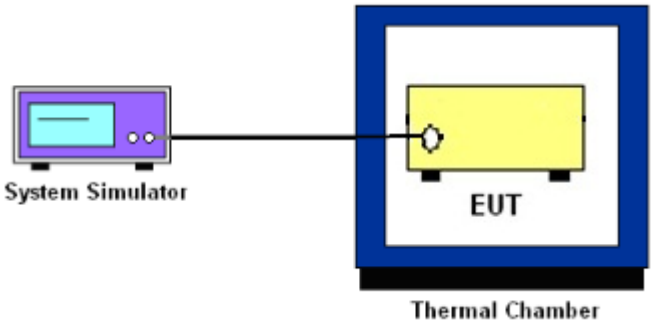
3.8.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.8.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation (FCC)

Band :	LTE Band 41 (QPSK)	Limit (ppm) :	2.5

Temperature (°C)	BW 10MHz	Result
	Deviation (ppm)	
50	+0.0003	PASS
40	+0.0009	
30	+0.0002	
20(Ref.)	+0.0000	
10	+0.0008	
0	+0.0001	
-10	+0.0006	
-20	+0.0011	
-30	+0.0014	

3.8.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 41 (QPSK)	10M	3.6	+0.0008	2.5	PASS
		Normal	+0.0012		
		4.25	+0.0016		

Remark:

1. Normal Voltage = 3.8V.
2. The manufacturer declared that the EUT could work properly between voltage 3.6V ~ 4.25V.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP30	101400	9kHz~30GHz	Mar. 03, 2014	Aug. 08, 2014~ Aug. 25, 2014	Mar. 02, 2015	Conducted (TH01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	May 08, 2014	Aug. 08, 2014~ Aug. 25, 2014	May 07, 2015	Conducted (TH01-SZ)
Thermal Chamber	Hongzhangroup	LP-150U	HD20120425	-40℃~150℃	Feb. 21, 2014	Aug. 08, 2014~ Aug. 25, 2014	Feb. 20, 2015	Conducted (TH01-SZ)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Aug. 16, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Aug. 16, 2014	May 25, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	23188	30MHz~2GHz	Oct. 26, 2013	Aug. 16, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Aug. 16, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jan. 27, 2014	Aug. 16, 2014	Jan. 26, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Aug. 16, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Aug. 16, 2014	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	6160100019 85	100Vac~250Vac	Mar. 25, 2014	Aug. 16, 2014	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Aug. 16, 2014	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Aug. 16, 2014	NCR	Radiation (03CH01-SZ)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9**